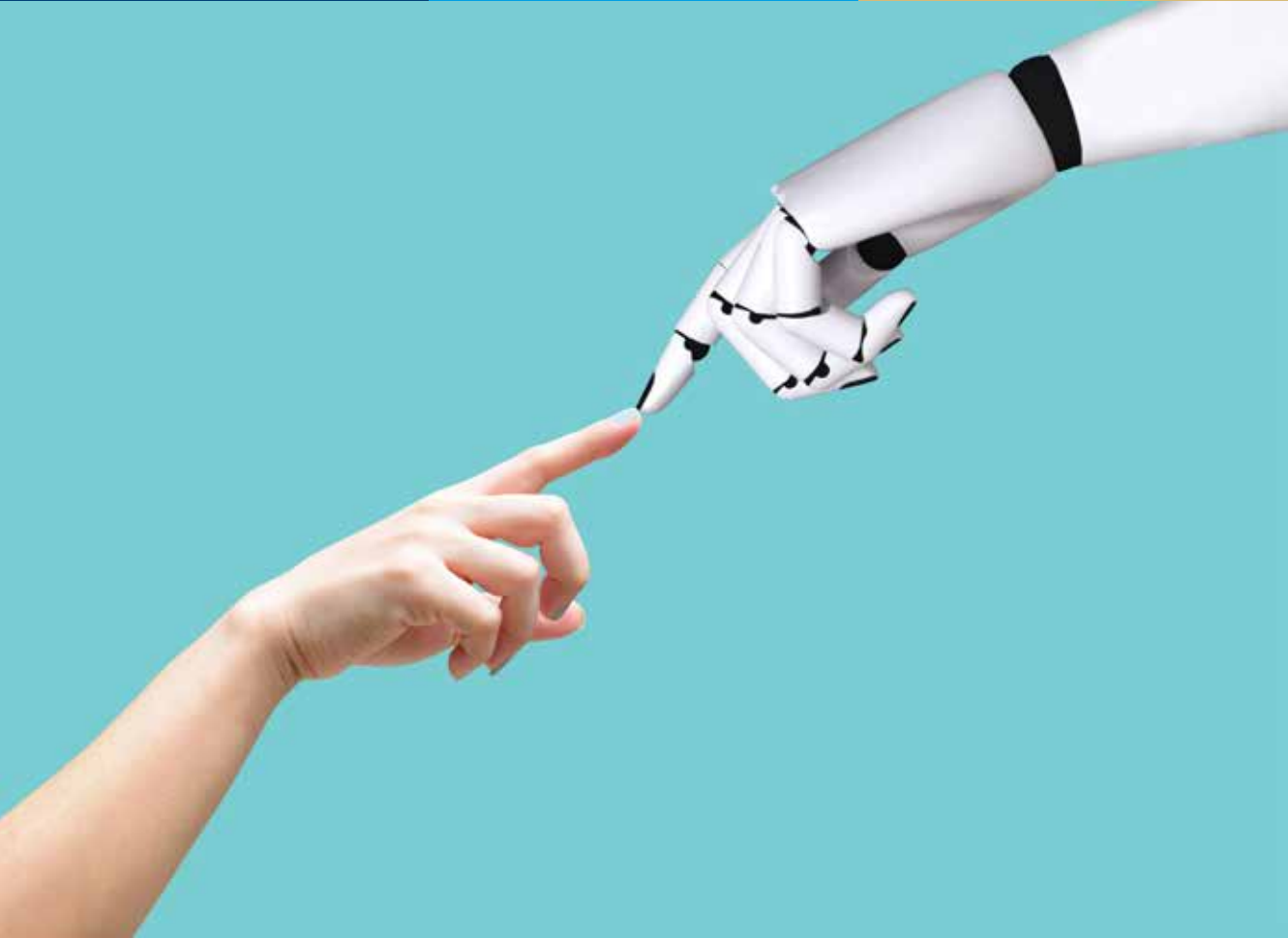




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Hiroo Hagino, Hannele Niiniö & Päivi Putkonen (eds.)

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# NEW WAYS OF PROMOTING MENTAL WELL-BEING AND COGNITIVE FUNCTIONS

Laurea Julkaisut | Laurea Publications | 105

Hiroo Hagino, Hannele Niiniö & Päivi Putkonen (eds.)

*NEW WAYS OF PROMOTING  
MENTAL WELL-BEING AND  
COGNITIVE FUNCTIONS*

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Page 164: Photo Päivi Putkonen  
Page 200: Art piece Katri Kaverinen

ISSN-L 2242-5241  
ISSN: 2242-5241 (print)  
ISSN: 2242-5225 (online)

ISBN: 978-951-799-508-5 (print)  
ISBN: 978-951-799-509-2 (online)

PunaMusta Oy, Helsinki 2019

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## TO THE READER

**Jouni Koski, Ph.D**  
**President, CEO**  
**Laurea University of Applied Sciences**



**A**t Laurea University of Applied Sciences, we guide our students towards working life as responsible and ethical experts with education and competence, for the sustainability of solutions, to strive for results, to produce an impact and to cultivate a desire and an ability to think in a human way. We believe that globalisation opens doors. Our students will graduate in a globalised world, in which global interactions are a natural part of everyone's work and studies. For this, higher education needs deep international collaboration, and the university needs long-standing partner institutions that share the same vision with which to learn together and from each other.

Deep international collaboration creates added value for many, not just for students. Through versatile research and development activities, collaboration offers many possibilities to learn together to teachers, researchers, companies, institutions and regions, too. This kind of joint publication is the way to share these findings widely. The authors have done very important and impressive work.

We want to thank Tohoku Fukushi University for very meaningful collaboration and partnership. During the past decade, Tohoku Fukushi University has been an important learning partner for Laurea University of Applied Sciences. We have learnt about many issues in bilateral collaboration to develop higher education in Finland. We want to increase people's ability to take personal responsibility for their lives and shared issues while supporting their active participation in society. For example, from Tohoku Fukushi University, we learnt how to improve the societal impact of higher education. Today, according to a new strategy in their studies, all students at Laurea University of Applied Sciences participate in voluntary activities that support society and well-being.

Higher education is the foundation for the development of humanity and societies, and international collaboration offers the possibility to understand phenomena and methods better in the future.



Delegation led by Laurea UAS vice president Dr. Helena Erjanti, visited SFWBC in 2005. During the visit delegation discussed with TFU and City of Sendai about academic collaboration in the field of social and health care. Japan and Finland were the world number one and number two in the speed of shifting from aging society to aged society and shared various common challenges. Meanwhile Japanese Long Term Care Insurance was under the revision and on the other hand, prevention, in which Finland has advantages, were hot topics in Japan. At the same time, client oriented care and effectiveness of social and health care were under critical conversation in Finland. We agreed possibility of academic collaboration, and TFU delegation led by Professor Yukio Ejiri visited Finland and discussed details. Based on this concept, academic agreement between six actors for Active Network consortium for “Refurbishing elderly care” designated in Helsinki year 2005.

Academic actors were TFU from Japan, Laurea UAS and Helsinki School of Economics (present as part of Aalto University) from Finland, industrial actor TFC from Japan, municipality actors city of Espoo and city of Vantaa from Finland. Happily, with outside competitive subsidy, we succeeded our joint research and held Finland-Sendai Seminars every year starting in Japan 2006. In Sendai area the test bed was Knowledge Cluster Initiative Project (years 2007-2011, founded by Japanese MEXT). In this project and organizing co-operation in Active Net one of the key persons was Professor Koichi Ogasawara. At the same time in Finland Project Driving Change in Elderly care (years 2008-2011, funded by European Social Fund), created possibilities for co-operation being joined effort of Finnish partners of Active Network. In this project, it was possible to create, test and evaluate new methods and organizational ways in elderly care. In seminars achievements and results was shared to each other and more widely also.

One of the fruits of this five years collaboration, were joint publications. These publications are in English “Kansei Fukushi Research Institute annual bulletin special edition”, TFU, 2006, and Erjanti & Ogasawara 2007: “Refurbishing Elderly Care; Strategy of Cost Efficiency in Theory and Practice”, Laurea publications 2007, and Erjanti & Ogasawara 2009: “Refurbishing Elderly Care; The New Streams and Organizational transformation in Finland and Japan”, Laurea Publication 2009. From TFU “The Concept of proactive health and social care service-dialogue with Finnish model” published from Fukushi Kobo in 2011 in Japanese language. In Laurea UAS the findings and results were introduced in English Publication: Vesterinen & Niiniö 2013, “Development Project as Driving Change in Elderly Care”. One ongoing process from the year 2006 until now has been developmental co-operation in Clinical Art, which is called Encounter Art in Finland. ISJ Publication Special Issue on Encounter Art promoting well-being, 2012, tells about this productive co-operation.

New stage of this academic joint collaboration was starting, but the Eastern Japan Great Earthquake and its Tsunami attacked TFU 2011. After the catastrophe, it was so difficult to continue international academic collaboration and unfortunately, new stage of alliance did not succeed. In 2015, TFU has recovered a little from disaster

Hiroo Hagino, Kati Komulainen & Hannele Niiniö

## FOREWORD

### History and background of this Joint Publication

The social intercourse between Tohoku Fukushi University (TFU) and Laurea University of Applied Sciences (Laurea UAS) started in 2005. Sendai Finland Well-being Center project (SFWBC) was executed at that time. Main coordinators were FINPRO, TEKES (both joined as Business Finland 2018) and STAKES (present THL since 2009). SFWBC aimed at promoting social and health care industry, introducing Finnish service and products to Asia. As City of Helsinki and City of Sendai had relationship for holding international conference together, City of Sendai applied to SFWBC project and was adopted as the 1st SFWBC in Japan. In 2004 care unit of SFWBC (Sendan-no-Yakata, Healthy Sendai) was completed. Likewise R&D unit was also accomplished in 2005.

SFWBC plan was to establish a consortium or cluster among research institutions, health and social care services and companies. In SFWBC, Finnish style nursing care home was constructed according to Finnish concept of nursing home. Because the city of Sendai had no own nursing care homes, Tohoku Fukushi Corporation (TFC) succeeded Sendai city’s own nursing care home participated FWBC project. TFC is so called “social welfare corporation”, which means a non-profit corporation and restricted to only public benefit with social welfare services. As TFC is managed by Tohoku Fukushi University, TFU joined SFWBC. In addition, under the Triple helix model, some universities in Sendai also participated FWBC from call of the city of Sendai. On the other hand, TFU had an expectation to activate its resource in social and health care.

damages and with the chance of 10- year anniversary of TFU-Laurea collaboration, we started to discuss next phase of collaboration.

## Concept of this publication

In 2017 Laurea UAS delegation led by Educational and Regional director, Dr. Kati Komulainen visited TFU and discussed topics for next joint research. We agreed that the topic of next stage would meet Japanese and Finnish common current theme, involve many members from both universities, activate both universities' resources, and be on the extent of our previous joint research. Based on this frame of reference, important challenges for both countries; dementia and depression were selected. We discussed more detailed and agreed that the research field is not a remedy of diseases but prevention and health promotion. We will focus on "promoting mental health" and "improving cognitive functions" with new methods, which has not applied in medical care. For example, "Art" or "Technology" to prevent not dementia and depression, but merely to prevent memory problems and promote mental well-being, were agreed as the research field.

Early diagnosis and early intervention are very important in dementia and depression to enhance possibilities to take care of the issues that emerge. However, there are still prejudice and social stigma for these diseases (especially in Japan, but in Finland also), proactive prevention and functional promotion are most important to avoid patients sufferings. Therefore, we picked up preventive services and new methods, which are able to reduce risk factors of these diseases.

TFU under its school motto: "Learning and practicing is inseparable harmony" established abundant research institutions and practice institutions. Authors of TFU picked up cases, which were not a mere theoretic paper plan, but based on practice. Laurea UAS, which also has abundant resource and network in health and social care field, researches and develops new practices based on its pedagogical model "Learning by Developing" in Laurea UAS Living Labs. The aim of this publication is to introduce realistic cases, based on new preventive services or methods that can reduce risk factors and enhance the quality of life of depression and dementia.

## Content of this book

Previous TFU - LAUREA joint researches focused mainly on elderly care. Major part of the members of the research had background from the social care. Therefore, regarding to framework of this new publication, we invited some new members to

join the co-operation. In TFU, many researchers from psychology field got invitation to join, so the lineup is now more interdisciplinary. Also in Laurea UAS, many new researchers from social and health care areas got invitation to join writers' team.

In the beginning of the publication, present situations and trends of prevention for dementia and depression in Finland and Japan are presented, co-authored by TFU professor Shinji Kato and Laurea chief R&D officer Päivi Putkonen. Professor Kato, with physiological background is a director of Dementia Care Research and training Center, Sendai. This center is based on national policy and three centers covers all over the Japan. In this part he introduced newest Japanese policy and methods for reducing risk factors of dementia and depression. Laurea researcher Päivi Putkonen presents prevention of depression and dementia in Finland today.

Articles of this joined publication are presented under three parts, which are Part 1 'Technological solutions in prevention', Part 2 'Preventive Innovative Methods' and Part 3 'Culture and Living Labs'. Final article 'Future Perspectives' summarizes and gives some perspectives to future outlook. Based on introduced cases of new preventive services, methods and technological solutions in both countries, we postulate sketch for new prevention for dementia and depression from Japanese and Finnish viewpoints.

As preventive services with new methods introduced in this publication are cultural and social system dependent, it is difficult to transfer them as such same form for other country or culture. For example, Japanese elementary education policy used to be very similar with Finnish one. However, the result of such similar education under different cultures was said to have been totally opposite. In this publication, we dare not to integrate Japanese sketch and Finnish one. Instead of that, taken account our social systems and cultural differences, we only make some suggestions. We hope that this publication will help various kinds of readers from different social systems and cultures to postulate new ways of preventive services for dementia and depression friendly society.



# PRESENT SITUATIONS AND TRENDS OF PREVENTION FOR DEMENTIA AND DEPRESSION IN FINLAND AND JAPAN

Shinji Kato

## PREVENTIVE CARE, MENTAL HEALTH AND MEMORY PROBLEMS AMONG ELDERLY JAPANESE

### Japanese Long Term Care Insurance (outline and background)

A long, healthy life is our universal desire. But in our older years, our physical and mental health change with the effects of aging and chronic disease. When elder care becomes necessary, family support is particularly important. In Japan, large, cohabiting multi-generational families were the traditional norm, and it was natural for family members to take care of the elderly as needed. In 1950, the average life expectancy for Japanese men was 58.0 years and 61.5 years for women. Those over 65 years of age made up only 4.9% of Japan's total population at that time.

From 1955, Japan entered a stage of high economic growth, and a stream of young people flowed from rural areas into urban centers. Three-generation cohabitation began to decrease as a result. Over time, the birth rate also began to decrease every year. By 2000, children (0-14 years) were outnumbered by the elderly (over 65), and Japan's population actually began decreasing from 2010. In 2017, the average life expectancy for Japanese men was 81.0 years and 87.1 years for women, with senior citizens (over 65) comprising 27.7% of the total population. Japan is now in a unique position as a "hyper-aged society" (aged population over 21%).

In modern Japanese culture, family care for the elderly has been largely lost, and this duty has been socialized. Accordingly, the Japanese Long Term Care Insurance

system (one type of social insurance) was established in 2000. Under this system, individuals over 65 requesting coverage must obtain certification of their need for long term care, and benefits are paid according to the need of support. The two certification categories are "Support Level" and "Care Level." Support Level is for elderly individuals needing light support in their daily lives, and possessing the potential to improve. Categorized as "Support Level 1" or "Support Level 2," they receive insurance benefits to cover preventive support aimed at minimizing their care needs for as long as possible. The Care Level classification is for elderly individuals whose condition will not improve significantly. They are categorized from "Care Level 1" to "Care Level 5" based on various factors, including activities of daily living (ADL).

Long Term Care Insurance benefits are not paid in cash. Certified individuals can purchase care services within the amount determined by their certification level. Clients must pay from 10% to 30% of the amount themselves, with the rest paid by insurance. Long Term Care Insurance premiums are collected from all persons over 40 years old, but those from 40-64 can only receive benefits in the case of one of 16 specified conditions (terminal cancer, juvenile dementia, etc.)

### Concept of prevention under Japanese Long Term Care Insurance

Under the Japanese Long Term Care Insurance system everyone over 40 must pay premiums. However, if too many of the elderly need care, the system becomes unsustainable. Since the system's start in 2000, it has become clear that the classifications of many individuals have gradually changed from Support Level to Care Level. The central government thus considered it necessary to provide preventive services to minimize this shift and keep the system viable.

Throughout this chapter, "preventive" will thus refer to services aimed at *preventing or, at least, delaying the need for a higher level of care*. For example, "long term care preventive service" refers to a service aimed at preventing the need for long term care.

In 2006, the Long Term Care Insurance system was revised, and preventive service become one of its core functions. Various levels of preventive service were initiated with the purpose of maintaining and improving ADL. In concrete terms, a physical examination (based on the Law of Health and Medical Services for the Elderly) following a "Basic Check List" is administered to all 65 year-olds. Based on the results, individuals at high risk of needing long term care are identified as "Specified Aged with Possibility of Long Term Care Need." With these candidates' consent, Comprehensive Community Care Centers develop preventive care plans and provide preventive services for them. Preventive services such as improving physical function with exercise, improving nutrition through guidance and improving oral function with preventive dental service are provided.

The central government estimated that 5% of the elderly would participate in these services, but it proved to be less than 0.5%. The Basic Check List was revised and more



attractive preventive services were developed. Development of services designed to promote cognitive function and prevent/retard dementia, as well as development of more effective, evidence-based programs are now ongoing.

## Preventive programs of Long Term Care Insurance

Senior citizens identified as Specified Aged with Possibility of Long Term Care Need by the Long Term Care Insurance system strongly resisted this label. The designation has since been revised to “Candidates for Secondary Prevention Programs.” Long Term Care Insurance services now include A. Long Term Care Preventive Services, B. Community-Oriented Services and C. Total Project for Care Prevention / Daily-Living Support (Community Support Project). The purpose of A and B is mainly to help elderly at the Support Level avoid the need for higher level, long-term care (Care Level), and the purpose of C is to help healthy, but high risk, elderly avoid even Support Level status.

### A. Long Term Care Preventive Services

The main type of long term care preventive service is a preventive day center service. In day service centers, mealtime, bath and toilet support, as well as exercise and recreation services are provided. Preventive day service centers are mainly housed in hospitals or long-term nursing homes with OT and PT staff available to provide rehabilitation services aimed at aiding clients in maintaining or recovering the physical and mental function necessary to maintain an independent daily life. Transportation is provided between home and center. Preventive home care is also available. Home-helpers visit clients’ home and provide not only household support like cleaning, washing and cooking, but also physical support for bath and toilet use. Support is provided based on clients’ needs and remaining abilities, with the aim of helping them continue their independent daily life.

### B. Community-Oriented Services

Only elderly residents of municipalities offering such services are eligible for Community-Oriented Services, consisting of Small-Scale Multi-Functional In-Home Care Service and Long Term Care Preventive Service with Dementia.

As its name suggests, Small-Scale Multi-Functional In-Home Care Service provides various in-home services for the elderly, including mealtime, bath, toilet, cleaning, washing, health management and rehabilitation support. Depending on a client’s situation, short-term stay in a facility is available as well. Rehabilitation and consultation services for maintaining independent daily life are also provided.

For individuals suffering with dementia, Long Term Care Preventive Service with Dementia is provided as a secondary preventive service. This service provides individuals experiencing relatively light dementia with mealtime, bath, toilet, cleaning, washing, health management and rehabilitation support, as well as consultation on daily life issues at day service centers. Daily Life Group Care for the Elderly with Dementia provides mealtime, bath, toilet and rehabilitation support in small (5-9 person) group homes in which individuals with relatively light dementia live together.

### C. Total Project for Care Prevention / Daily-Living Support (Community Support Project)

This type of service offers support for individuals over 65 with no requirement for long-term care certification. Provided by municipalities based on clients’ particular situations, Long Term Care Preventive Service for Specified Aged with Possibility of Long Term Care Need (high-risk group) and Long Term Care Preventive Service for General Elderly are two of the types of service in operation. Sometimes these two preventive services are together called Long Term Care Preventive Care Management.

Long Term Care Preventive Service for Specified Aged with Possibility of Long Term Care Need (high-risk group) is a project targeting high-risk elderly individuals certified by municipalities as Specified Aged with Possibility of Long Term Care Need. If candidates request help from a Comprehensive Community Care Center in developing their own, tailor-made Long Term Care Preventive Care Plan, they can utilize this service. Its visitation service includes visiting home-helpers providing daily life support, meetings with a daily life consultant, nutrition improvement advice from a public/certificated nurse, meal delivery service, and/or a safety/health monitoring service. Such day services are provided by public organizations commissioned and funded by municipalities, including medical organizations (e.g., hospitals), public health centers, social welfare organizations or visiting care service centers for the elderly.

The latter service is for all elderly over 65, including healthy individuals not using Long Term Care Insurance. Municipalities provide residents with a variety of services, including lessons on walking, drawing and cooking, and support for volunteers and volunteer group activities such as holding health seminars, health training, lectures on dementia prevention, lectures on nutrition improvement, or lunch meetings.

Municipalities also educate residents on long-term care prevention, providing basic information and supporting resident volunteers in providing long term care preventive activities. Such activities include delivering prevention leaflets and handbooks, participating in local prevention events and holding lectures.

## Reasons for long-term care and its prevention

Every two years, the Japanese government conducts large-scale research on living conditions in Japan—the so-called “Comprehensive Survey of Living Conditions.” It yields useful information on elderly households and their income, health and need for long-term care. The most commonly listed causes for a change in status from Support Level to Care Level are, in order, joint disease, age-related asthenia and bone fractures from a fall. Common reasons for changes to a higher Care Level designation (more intensive long-term care) are, in order, dementia, cerebrovascular disease and age-related asthenia.

In light of these results, it is important to prevent or delay development of such age-related conditions as joint disease, decrease of physical function with disuse syndrome, dementia, and cerebrovascular disease. Mental health issues are also central—as depression is common among the elderly—and preventive support is a serious challenge.

## Concrete methods for promoting mental health among the elderly

### A. Prevention of disuse syndrome

Disuse syndrome is a decline of physical function caused by a decrease in physical movement and activity. Elderly individuals can lose 20% of their muscle mass within two weeks of beginning bed rest. Main mal symptoms of disuse syndrome are not only a decline in exercise capacity and cardiopulmonary function, but also a deterioration of mental health. If the elderly cannot use their bodies as they intend, depressive feelings are likely to follow. Physical and mental condition can spiral downward together in a vicious cycle. For example, an elderly individual enters the hospital for an extended stay. Prolonged inactivity leads to a decline in cardiopulmonary function and decreased exercise capacity. This leads to a drop in motivation to move, bringing further decline in exercise capacity and depressive feelings associated with isolation and lost activity. Any senior experiencing a long-term decrease in activity—in hospital or at home—is at risk of disuse syndrome.

Elderly individuals suffering from disuse syndrome typically find it difficult to impossible to recover their original activity level. Prevention is thus much more important than any cure. Purposeful rehabilitation begun before disuse syndrome can set in is critical. Focusing on whatever movement and activity are practical has great effect. Hard exercise is not necessary, as light exercise and flexibility work, like stretching, are effective. Even bed-ridden individuals can rotate their ankles, move their toes or massage their own hands and feet as preventive measures.

Besides physical exercise, listening to seniors’ anxieties and inviting them on outings can relieve their concerns and provide refreshment. Supporting their participation in familiar hobbies like music, art, dance etc. provides mental support and has a preventive function, even if little physical exercise is involved.

### B. Health promotion to prevent depression

Depression, one type of mood disorder, is increasing universally, especially in advanced countries. In the EU, the prevalence of mental diseases is 38%<sup>1</sup>. According to a WHO report, over 3 hundred million people, globally, are suffering from depression and the number increased by 18% from 2005 to 2015.

Depression is also a challenge in Japan. According to numbers published every three years by the Japanese Ministry of Health & Labor, the number of patients with mood disorders increased from 433,000 (1996) to 1,041,000 (2008), a rise of 240%. This statistic only includes patients who consulted a medical doctor or entered the hospital. The actual number of sufferers has been verified to be higher<sup>2</sup>.

The symptoms of mood disorder are quite varied, ranging from losing interest or enjoyment in work or hobbies, to losing a sense of vitality, to feeling melancholy or depressed. Physical symptoms like insomnia, anorexia, weight loss, or malaise may also appear.

Although the cause(s) of mood disorder has not been clearly established, a complex of multiple factors like stress, socio-cultural issues and/or life style may be involved. Certain character traits, such as being particularly punctilious, devoted, or hard working, also appear to be risk factors.

“Depression” is classified as a mental disease, but “depressive state” is not, and many people possess its risk factors. For both conditions, early detection and intervention are important, but mental health promotion to prevent their onset is also necessary.

A lack of regular exercise is a life style trait associated with depression, so establishing a habit of regular exercise is highlighted as a way to avoid and treat depression and depressive state. Aerobic exercise, in particular, is considered effective based on research with swimming, Yoga, jogging and running. The more strenuous the exercise, the more depressive symptoms are reduced. However, even light exercise has an effect. Reports on the effectiveness of sport and physical leisure activities in preventing the onset of depressive states further reinforce their importance. Thus, establishing a habit of regular, intentional exercise is important.

1) Wittchen, H.U., Jacobi, F., Rehm, J., et al: *The size and burden of mental disorders and other disorders of the brain in Europe 2010. European Neuropsychopharmacology*, 21;655-679, 2011

2) Norito Kawakami, *Academic Report of Large Scale Epidemic Research on the Prevalence of Mental Disease: World Mental Health Japan Research Second, Japanese Ministry of Health, Labor and Welfare support project (Japanese language)*, 2016.

### C. Improving cognitive function and prevention of dementia

Dementia is a disease caused by deterioration in brain function, Alzheimer's dementia being a typical example. Fundamental in dementia prevention are the reduction of risk factors and promotion of potential protective factors. Some risk factors are inescapable, such as aging, female gender and inherited genetic traits. Nevertheless, risk factors such as diabetes, high blood pressure, dyslipidemia, obesity, metabolic syndrome, smoking, traumatic brain injury and pessimism are avoidable. We must take care to avoid these throughout life.

Much research on dementia prevention involves MCI (Mild Cognitive Impairment), denoting a condition between dementia and normal health. A four-factor checklist is used in diagnosing MCI: (1) Memory problems are recognized by the client him/herself or his/her family. (2) More than one objective cognitive function disorder (memory problem, orientation disorder, etc.) is recognized. (3) ADL is normal. (4) Dementia is not present.

MCI has symptoms similar to dementia, but these do not meet the full criteria for a diagnosis of dementia, such as support being essential for daily life. So MCI is said to describe a gray zone between normal functioning and dementia.

It is generally thought that lacking adequate support, 50% of individuals with MCI will develop dementia. Some individuals with MCI are in the very early stages of dementia, while some are dealing with disuse syndrome. Even though their MCI symptoms are similar, the causes may be different. Given adequate assessment and support, many of these individuals have the potential to recover normal function. Indeed, some MCI sufferers do not develop dementia, but recover.

Common characteristics of MCI sufferers who recover normal function are regular exercise, curiosity and a challenging spirit. Following from this, the six methods below are thought to have promise in the prevention of dementia.

#### **Regular exercise**

Thirty minutes of aerobic exercise, three times a week, is reported to be effective in preventing or delaying MCI. Not so strenuous, but sustained exercises like walking, jogging, swimming and yoga are recommended.

Anaerobic exercise is characterized by limited breathing and low oxygen supply. Aerobic exercise involves deep breathing and up-take of oxygen. This continuous up-take during exercise brings a plentiful supply of oxygen-rich blood to the brain, helping to keep the brain young. Dual task exercise is recommended to magnify this effect. This involves doing two tasks simultaneously—like doing mental calculations while walking. Performing two tasks simultaneously further increases blood flow, increasing the preventive effect against dementia. Of course, such divided attention can raise the risk of accident, so proceed with caution.

#### **Improvement of diet**

It is important to consistently eat a variety of foods. Vitamin C, Vitamin E and beta carotene in vegetables and fruits have high preventive effect. Unsaturated fatty acids from fish are also effective.

#### **Adequate sleep**

Adequate, nightly sleep is important for dementia prevention. Short naps (about 30 minutes) also have a preventive effect. On the contrary, long naps can interfere with sound night sleep and increase the risk of dementia. Keeping a daily routine with a fixed rising time, exposure to sufficient sunlight, and an adequate schedule of day-time activities is very important.

#### **Interaction with others**

Plentiful interaction with others also has a preventive effect against dementia. Through daily interaction, we engage in guessing others' feeling through their expressions and create a social structure/schedule providing further opportunities for interaction. These activities have been found to be effective in maintaining brain function.

#### **Increasing intellectual activity**

Intellectual activity stimulates the brain; thus its preventive effect. Playing favorite board games (chess, etc.), and solving challenging puzzles and games are effective, as are writing letters, diaries, etc. Out-of-the-home activities like museum visits can also be very stimulating and effective.

#### **Cognitive function training**

At the MCI stage, cognitive functions, including episodic memory, segmentation of attention, and planning function, deteriorate. Episodic memory is the ability to recall previous events with relevant details such as date and place, the people involved and one's feelings at that time. To strengthen this ability, writing diary entries 2-3 days after the event while recalling the details, keeping shopping records, etc. are recommended. Segmentation of attention is the ability to do multiple tasks simultaneously or pay attention to multiple matters at the same time. To strengthen this function, complete two tasks at the same time, for example, calculating while walking, cooking two dishes simultaneously, and stretching while watching TV or playing a musical instrument. The planning function is the ability to make plans for travel, outings, or shopping and put these plans into practice. Creating a recipe for a dish to cook or setting up a travel plan are examples of planning function training.

These types of cognitive function training stimulate the brain and bring joy to life at the same time. Starting with one's personal interests brings enjoyment and potential for long-term engagement. For people who find systematic training difficult, simply increasing opportunities to talk with others is useful in cognitive function training. Again, interest and enjoyment are key. Training with an uninteresting or disliked topic or activity is likely to cause stress, which can have adverse effects and negate any good one hopes to accomplish.

## Improvement of QOL

Improvement of QOL (quality of life) is an important factor in promoting mental health among the elderly. QOL can be discussed in terms of objective QOL and subjective QOL. Objective QOL can be estimated by others objectively. It means good ADL (activities of daily living) including eating, toilet use, bathing, changing clothes, moving about, independent living, mental and physical health and economical independence. Subjective QOL is what the individual feel subjectively—feelings of happiness and worth in life.

The preventive concepts discussed in this article are all considered effective methods of improving both of these QOLs. To promote mental health of the elderly, both QOLs must be kept in mind toward improving overall QOL and health. We will see Japanese and Finnish practices based on these concepts in parts 1, 2 and 3 of this book. In the next section, we will also see present practices and trends in the prevention of dementia and depression in Finland.

Päivi Putkonen

## THE PRESENT SITUATION OF DEMENTIA AND DEPRESSION IN FINLAND

In Finland (population of 5,520,535 million inhabitants in 9/2018), one in three adults over 65 years of age report suffering from memory problems. There are as many as 200,000 people with moderate impairment of cognitive ability, and 100,000 suffering symptoms with mild and at least 93,000 with moderate dementia (Muistisairaudet 2017). In 2004, the costs of dementia, including indirect costs, were almost €1 billion (to be precise €989,000). Indirect costs were not included. The costs associated with memory illness depend on the stage of illness. It is estimated that 85% of the direct costs are incurred for 24-hour care (Neittaanmäki, Malmberg & Juutilainen 2017). Direct and indirect costs for one person with a memory illness were approximately €36,000 in 2008 in Northern Europe. Alzheimer's Disease International (ADI) estimated in its 2015 report that the cost of memory diseases worldwide was close to \$600 billion in 2010. Most of these costs are generated in Europe and North America. In 2015, global costs were estimated at nearly \$820 billion, and costs were estimated to rise significantly in the coming years. Globally, in 2010, 35.6 million people were estimated to have dementia, and that number was predicted to double by 2030, and more than triple by 2050 (Tolppanen et al. 2016).

In memory disorders, prevention and early treatment have an effect on the progression of the illness and independent living. Large, population-based research efforts on ways of delaying dementia, patient institutionalization or deterioration



of health status are urgently needed (Tolppanen et al. 2016). Every year, about 14,500 new people in Finland are reported to suffer from dementia. A significant part of the memory disorders remains undiagnosed (Muistisairaudet 2017). More new innovative preventive methods are needed. Finland has the highest relative dementia mortality rate in the world. The reasons for that are unknown. However, in addition to well-known diseases related and genetic factors, some factors such as environmentally related causal factors have been suspected (Eiser 2017). Dementia itself is not a disease but a symptom, and is what underlies a disease that weakens the brain. Although dementia is often used as a synonym for Alzheimer's disease, dementia-associated symptoms may be due to several different diseases. (Knuuti 2015).

According to WHO (Dementia: a public health priority. 2012), the most common dementia subtypes are Alzheimer's disease, vascular dementia (VaD), dementia with Lewy bodies (DLB) and frontotemporal dementia (FTD). Dementia has parallel diseases that promote the development of dementia, such as Parkinson's disease. The key brain changes linked to Parkinson's disease and Parkinson's disease dementia are abnormal microscopic deposits called "Lewy bodies" (Alzheimer's and dementia 2018).

Pharmacotherapy is the most commonly used treatment for memory dysfunctions. Overall, the background reasons for memory loss can be very complex. The other kinds of co-perpetrator diseases that can be related to dementia are, for example, the different types of severe drug resistant epilepsies in which seizures cause brain cell loss, synaptic-level disconnections and difficulties memorizing with short- and long-term memory. Also, according to Hommet et al. (2008), Alzheimer patients have an increased risk of epilepsy and, when both disorders are present, they constitute a complex association with a potentially major psychosocial impact.

Dementia itself can be a result of long-time suffering from other serious illnesses such as cardiovascular diseases, diabetes and obesity (Table 1). Brain circular and metabolic imaging (PET = Positron Emission Tomography) can be used to find out more about the disease. However, the distinction between the underlying diseases of dementia is very difficult (Knuuti 2015). The reasons can also be genetic (Pasanen 2018).

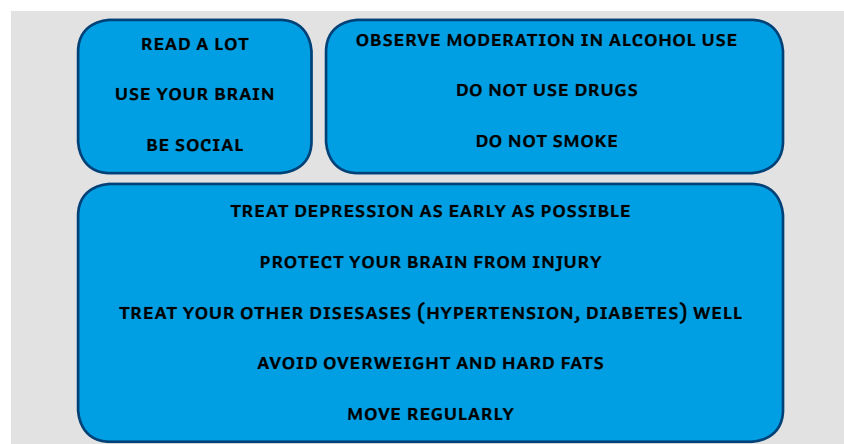
Pathological changes in the brain tissue associated with Alzheimer's disease may start to develop decades before its symptoms are visible/measurable and it is possible to get dementia diagnoses. In a study by Nordström & Nordström (2018), the risk of a dementia diagnosis decreased over time after traumatic brain injury (TBI) (Table 1), but it was still evident >30 years after trauma. It was found that the association was stronger for more severe TBI and multiple TBIs, and it persisted after adjustment for familial factors.

**Table 1.** Risk factors leading to dementia.

HIGHER RISK RELATED FACTORS FOR DEMENTIA
AGE > 65
FAMILY HISTORY
GENETIC FACTORS, THE MOST IMPORTANT APOLIPOPROTEIN E ALLELE E4
LOW EDUCATIONAL LEVEL
MINOR MENTAL ACTIVITY
LONELINESS AND LACK OF A SOCIAL NETWORK
DEPRESSION
SMOKING
DRINKING PROBLEM
PLENTY OF SATURATED FATTY ACID DIETS/FOOD
NON-EXISTENT ANTIOXIDANT INTAKE
BRAIN INJURIES (TBI = TRAUMATIC BRAIN INJURY)
CEREBROVASCULAR DISORDERS
HIGH BLOOD CHOLESTEROL LEVELS IN THE MIDDLE AGES
HIGH BLOOD PRESSURE AT MIDDLE AGE
INSULIN RESISTANCE
DIABETES
METABOLIC SYNDROME
OBESITY AND OVERWEIGHT
LOW PHYSICAL ACTIVITY
INFLAMMATION IN BODY
LOW HORMONE LEVELS, MENOPAUSE (WOMEN)
OTHERS (E.G. EPILEPSY, POISONING, DRUGS)

(Knuuti 2015, Muistisairaudet 2017, Juva 2018, Nordström & Nordström 2018, Hommet et al. 2008)

However, in what other ways, in addition to the pharmacological and other treatments given by health care professionals, are we able to prevent or delay dementia and diminish its symptoms, such as aggression, anxiety, restlessness and memory disorders? A long time before getting a diagnosis and starting to take medication, there are factors that are known to help: a high level of education, physical activity, a balanced diet and an active lifestyle (Table 1, Figure 1). (Juva 2018) Also, in a study by Laukkanen et al. (2017), moderate to high use of sauna was associated with a lowered risk of dementia and Alzheimer's disease in men. However, it is very important to be active throughout one's whole lifetime (Figure 1).



**Figure 1.** How to prevent the development of dementia (Juva 2018)

Depression is a major public health problem that affects about 5% of Finns (prevalence). Key therapies include antidepressants and active psychotherapy. In depression care, the priority areas are both primary health care and psychiatric special medical care (Depressio. Käypä hoito suositus 2016). The differential diagnostics of depression and dementia are particularly difficult to make because their symptoms are somewhat similar. Depression is often the first symptom of Alzheimer's disease. Years before the appearance of significant cognitive changes, the patient becomes passive, withdraws from challenges and experiences depression and drowsiness (Juva 2018).

Depression increases the risk of physical morbidity and, for example, the risk of a depressed person having coronary heart disease is two to three times greater than that of other people. In 2013 in Finland, approximately 46% of all disability pensions were based on mental health and substance abuse disorders. According to Neittaanmäki et al. (2017), this means nearly 70,000 people. Of these, more than half were retired due to depression. In general, due to depression, two and a half million days a year are lost to sick leave.

The number of days due to sick leave amount to a total cost of €877 million per year for the state, municipalities and businesses. By 2020, serious depression around the world will increase to become the second most significant public health problem after coronary heart disease (Neittaanmäki, Malmberg & Juutilainen 2017). The majority of depressed people can be treated in primary health care. The treatment plan is carried out in conjunction with the patient (Health Care Act 1326/2010 Section 24, subsection 3).

As seen in Tables 1 and 2, the risk factors leading to dementia and depression are fairly similar. It would be interesting to see in a large cohort study how preventive methods work for both of them, as interventions in all age groups in a controlled study.

**Table 2.** Risk factors leading to depression

RISK FACTORS LEADING TO DEPRESSION
OLD AGE
FAMILY HISTORY
BEING A FEMALE (SPECIALLY FOR LATE LIFE DEPRESSION)
HEREDITARY TENDENCY (GENETICS)
BEING A WIDOWER OR SINGLE (SPECIALLY FOR LATE LIFE DEPRESSION)
LOW EDUCATION LEVEL
TRIGGERING NEGATIVE OR TRAUMATIC LIFE EVENTS
MINOR MENTAL/COGNITIVE ACTIVITY
LONELINESS, LOW SOCIAL ACTIVITY
LACK OF A SOCIAL NETWORK
EXPOSING PERSONALITY TRAITS
SMOKING
DRINKING PROBLEM
SLEEPLESS EPISODES
LACK OF EXERCISE
OBESITY
THE PRESENCE OF PHYSICAL ILLNESS
USE OF MULTIPLE DRUGS FOR ILLNESSES (SPECIALLY FOR LATE LIFE DEPRESSION)
EXISTENCE OF PSYCHOSOCIAL STRESSORS
THE PRESENCE OF BRAIN WHITE MATTER CHANGES

Sources: [Sözeri-Varma 2012, Depressio (Käypä hoito suositus 2018)]

The following articles in this publication introduce some new innovative complementary forms of care and methods that have been found to be beneficial for customers, and successful for professionals. Many of them are closely related to medical technology. As the medical sciences like neurology, general medicine and neurosurgery continue to evolve, we also need new knowledge from applied know-how and new ways to improve people's health, especially from the most fragile age groups of the elderly and children.

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PART I  
TECHNOLOGICAL  
SOLUTIONS  
IN PREVENTION



Kazuki Iwata, Makoto Ohuchi & Junichi Urushiyama

## POTENTIAL FOR HUMAN-INTELLIGENT MACHINE COOPERATION IN ELDER CARE AND EDUCATION FOR CHILDREN WITH LEARNING DISABILITIES

### Introduction

Today's remarkable developments in computer, information and communications technology (ICT), and in machine learning (ML) algorithms have led to enormous improvements in artificial intelligence (AI) and machines equipped with AI [1]. These new algorithms and machines have made possible innovations such as master-level, board-game playing machines [2, 3], self-driving cars [4], automatic voice recognition systems, and the speech interpretation and recognition interfaces (SIRI) found in mobile phones [5] and smart speakers [6–9]. We anticipate that these algorithms and machines will lead to even more advanced technologies and new services in numerous fields, at all levels—from popular consumer to national government.

At the government level, Japan's Ministry of Internal Affairs and Communications (MIC) has developed a strategy to deal with the growth of AI, ICT and their machine applications. The 2016 White Paper on Information and Communications predicted further growth in the societal role of big data, robots, and ICTs in alleviating the effects of Japan's declining birthrate and aging population [10]. Moreover, the 2017 White Paper particularly noted the need for progress in AI for handling and analyzing big data [11].

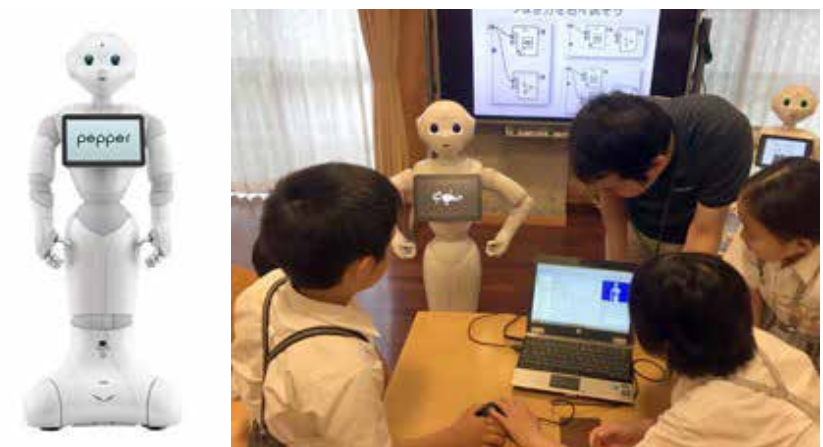
At the popular consumer level, one can already find concrete examples. Auto-generation algorithms, such as generative adversarial networks (GANs) and long short-term memory networks (LSTMs)—introduced in 2014 and 1997 [12, 13], respectively—have attracted much attention. These algorithms make possible new web services such as “PaintsChainer,” which automatically colorizes uploaded line drawings [14] and the natural language dialogue system, “BATO-SHOJO” [15]. These examples are just a taste of the new services using the latest ML algorithms. In fact, auto-generation algorithms account for only a small part of the ML algorithms in use and under development for a wide range of applications.

Moreover, AI-equipped intelligent robots are finding application in various fields. For example, “Pepper” is the most popular intelligent robot in Japan (Fig. 1(a)) [16]. Pepper (121cm tall, 28kg) was developed by Softbank Group and Aldebaran Robotics Inc. (now Softbank Robotics). It is the world's first emotion-recognition robot equipped with an emotion engine and cloud AI. One use of the robot is in education, where, for instance, it has been employed in a programming course at Ritsumeikan Elementary School in Kyoto (Fig. 1(b)).

We have great expectations for the application of such new robots in elder care, education, and other fields. In particular, there is great hope that communicative robots, such as Pepper, can become effective collocutors for the elderly, helping to prevent feelings of isolation and maintain mental health.

But in these early days it remains unclear what robots can and cannot effectively do in providing services for, and cooperating with, humans. What roles should robots be designed to play in such areas? How and where should distinctions between the roles of humans and robots be drawn?

Based on the results of two case studies, we here discuss difficulties in using robots with humans, and issues regarding human-robot cooperation.



**Figure 1.** (a) Pepper (left) [16] and (b) a programming class with Pepper at an elementary school (right).

## Case Studies

In this section, we examine human–robot cooperation by presenting two case studies in different welfare fields: elder care and special education for children with learning disabilities. Both studies employed “Palmi” [17], a communicative robot.



Figure 2. Palmi [17].

### About Palmi [17]

Palmi is a bipedal, communicative robot developed by Fujisoft Inc. and manufactured by Vaio, Sony Corp. (Fig. 2). At 40 cm tall and 1.8 kg, Palmi is much smaller than Pepper (introduced above).

As Palmi was developed to be an inspirational partner like a family member or friend, its design emphasizes smooth and natural communication with users, and its “Dear Talk Engine” system utilizes some of the latest ML and AI algorithms for conversation. A particularly salient feature of Palmi is its self-test capability, allowing independent self-repair of system bugs.

## 1) Study of Robot Use at a Facility for the Elderly [18]

### Background

The gourd-shaped Japanese age pyramid (Fig. 3)—based on the national census of 2010–2013—reflects the decreasing birth rate since 1975, the peak of the second baby boom (45–49 age band) [19]. In addition, because those born in the 1940s, during the first baby boom, passed 65 years of age in 2010, the boom-related, peak population bands will move steadily through the senior range over the next several decades. These combined trends mean that Japan’s senior population will continue to rise while its working population falls. In 1980, the number of Japanese over age 65 reached 10 million. In 2000 and 2012, that number reached 22 and 30 million, respectively, comprising 17% and 27% of the total population (Fig. 4). In addition, MIC forecasts that by 2040 these figures will approach 40 million and 40%. These data make clear the need to deal with such a rapidly increasing aging of the population.

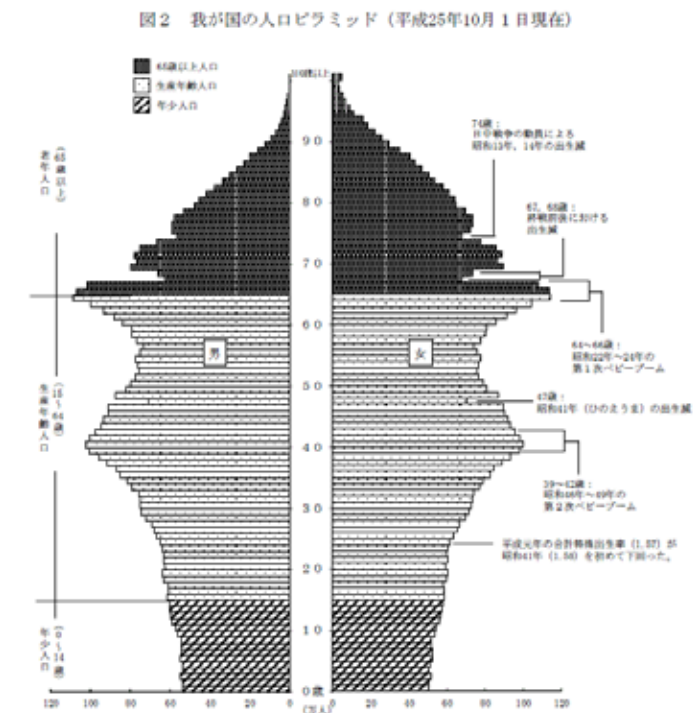
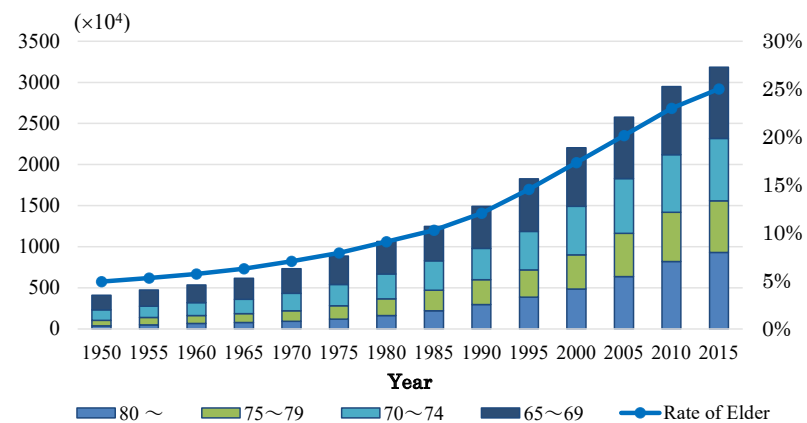
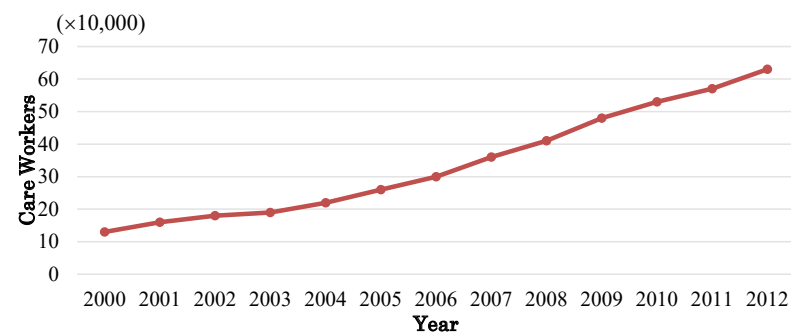


Figure 3. Age pyramid of Japan’s population in 2013 (based on national census of 2010–2013) [19].



**Figure 4.** Number and population share (%) of the elderly in Japan [19].

Who will care for our aging population? The Japanese Health, Labor and Welfare Ministry (HLWM) publishes annual care worker figures (Fig. 5). [20] These data show that the number of care workers increased from 180,000 to 600,000 from 2000 to 2012, reflecting the increasing demand for care of the elderly. Comparing the number of care workers with the number of elderly 65 or older yields a ratio of 50:1. Of course, not all these individuals desire or need care, but the figure underscores the lack of care workers, and forecasts predict a severe shortage of care workers in coming years.



**Figure 5.** Number of care workers in Japan: 2000-2012 [20].

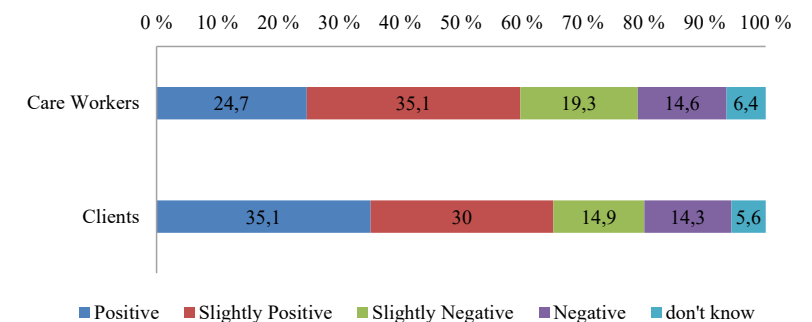
For these important reasons, development of robots with AI and/or communication ability is keenly anticipated in the elder care field, and there have been some recent attempts to employ robots in a support capacity—aiding care workers with transfer-, meal- and rehabilitation-related tasks. For example, “RIBA,” developed by

RIKEN-TRI Collaboration Center for Human Interactive Robot Research, is a robot supporting the movement of elderly people around a facility (Fig. 6(a)) [21]. RIBA was designed to look like a stuffed bear—a familiar image engendering acceptance among seniors and care-givers. “HAL” (Cyberdyne Inc.) (Fig. 6(b)) [22], designed to support physical functions and facilitate their regeneration and expansion, has also attracted attention.



**Figure 6.** Robots for elder care: (a) RIBA (left); (b) HAL (right).

A special investigation by HLWM in 2015 showed that caretakers and clients had roughly similar attitudes toward the use of robots (Fig. 7) [23]. It also revealed that one of the highest time demands on care workers was preparation of varied daily recreation sessions to keep elderly residents from “falling into a rut” with daily activities. Some care workers hoped robots could help lighten this load.



**Figure 7.** Attitudes toward using robots for care services. Total percentages of responding care workers and clients with positive to slightly positive attitudes were, respectively, 59.8% and 65.1% [23].

In this case study, to assess the potential benefits and difficulties involved in using robots for daily recreation for elderly people, we developed three recreational applications for Palmi which it could perform independently with senior users. The first was the Japanese word chain game, “shiritori.” The second was a special rock–paper–scissors game, in which a player chooses a winning move after seeing the opponent’s (Palmi’s) move. The last was a rhythm game.

## Methods

Detailed methods for creating applications for daily recreation using Palmi were described by S. Sasaki et al. in a 2016 graduation thesis for Tohoku Fukushi University [18]. They detailed the creation of a development environment for programing Palmi and the programing code used, as well as the rationale behind, and design of, the recreation activities described here.

The Japanese word chain game, “shiritori,” was chosen to stimulate interaction between an elderly person and Palmi, hopefully relieving loneliness through their communication. Palmi starts the game when someone says, “shiritori... game start.” The robot begins by uttering a word randomly selected from a list programed by the authors, and the player replies with another word according to the rules of the game. If the robot recognizes this word, it then offers another suitable word from its list. If not, the robot asks the player to repeat, and the game proceeds in this fashion. As some elderly individuals may find it difficult to concentrate on the game for an extended period, the game ends after ten turns, and Palmi says, “I am surrendering and you win.” If the player says “give up” or the robot does not receive a response in 30 seconds, Palmi regards the game as abandoned and closes the game.

The special rock–paper–scissors game is also intended to relieve loneliness. To start a game, a player says to Palmi “rock–paper–scissors game start.” The robot then explains the rules of the game and indicates its choice of rock, paper or scissors by striking a body pose, displaying a graphic on the head-mounted monitor, and speaking the word, “rock,” “scissors,” or “paper.” (Fig. 8). The player attempts to reply



**Figure 8.** Poses and graphics for rock, paper and scissors (left to right).

by uttering the word for a winning move. The game ends after five such exchanges. Interestingly, the robot does not keep score or attempt to recognize the utterances of its opponent. This is left to the human opponent in order to maximize the speed and smooth, natural flow of the interaction.

The rhythm game is a light exercise activity employing Palmi as an independent instructor with the intention of lightening the load of future, over-extended care workers. The game starts when a player sits face to face with Palmi. The robot explains the goal of touching hands in rhythm with the music.

To evaluate these programs, experiments were conducted on 17 January, 2017 at a nursing home for the elderly, “Sendan-no-yakata” [24]. The 18 participants were users of the day service there. They played shiritori, rock–paper–scissors, and the rhythm game with Palmi leading, assisted by TFU students. Figure 9 portrays a scene from the session. We evaluated the effectiveness of the Palmi-based recreational applications using questionnaires and participant observations.



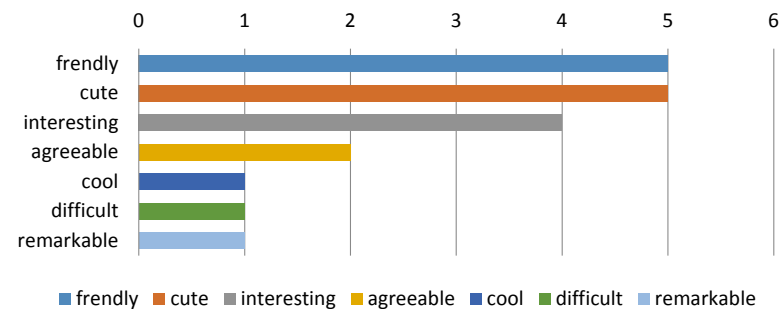
**Figure 9.** Scene of recreation session led by Palmi.

## Results

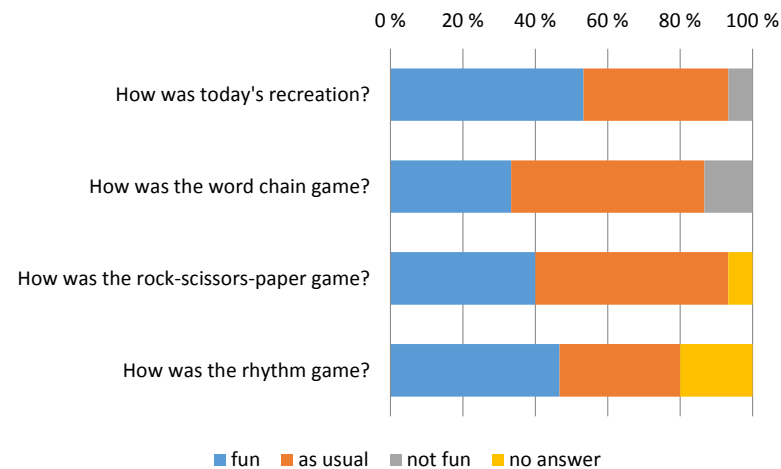
Figure 10 shows feedback from participants on their feelings about Palmi. Participants chose descriptors from a list of choices. Multiple answers were allowed, and feedback was generally positive. Figure 11 presents results of the questionnaire on the Palmi-led recreation session, which indicate that participants generally enjoyed the recreation. Participant’s spoken observations after the sessions indicated, that those who enjoyed the games were interested by the robot’s movements, such as playing music or over-reacting to stimuli. These results indicate the possibility of robot-led recreation sessions reducing the burden on care worker. We also



observed elder participants talking with Palmi, much as they would with any human, when they played the shiritori word chain game. This suggests that robot-human interaction could help seniors retain cognition function and help prevent feelings of isolation, which can compromise mental health.



**Figure 10.** Participants' feedback regarding Palmi.



**Figure 11.** Recreation questionnaire results.

There were, however, some difficulties. First, Palmi's computer-synthesized voice was difficult for some elderly people to catch. Also, its voice recognition success was not high. Especially, Palmi was unable to recognize local dialect words such as "zukku," meaning "shoes" ("kutsu" in standard Japanese). Furthermore, care workers observing the recreation session felt that it would be difficult to have recreation activities led by a robot alone, as it's occasionally long response times bothered participants, thus necessitating human support.

These difficulties are important issues in robot utilization and development.

## 2) Effectiveness of Robots in Supporting Children with a Developmental Disability [25]

### Background

Remarkable recent developments in ICT have led to the introduction of new educational methods utilizing the Internet, tablet computers, augmented-reality technology, and robots. Some researchers are studying the applicability of these new methods to education for children with developmental disabilities, as defined by the Act for Support for Persons with Development Disability [26]. For example, Kojima et al. investigated mediated communication with children with autism using a soft toy robot named "Keepon" (Fig. 12, left panel) [27, 28]. Also, Munekata et al. advanced a new learning environment for special needs education using a robot called "PaPeRo" (Fig. 12, right panel) [29, 30]. These studies suggest that delivering input by robot can be more effective because these children often feel more comfortable with robots than adults. However, these robots were not intelligent robots. Consequently, the effectiveness of such education with intelligent robots have not been established.



**Figure 12.** Robots used for education of persons with developmental disabilities [28, 30]. "Keepon" (left) [27] and "PaPeRo" (right) [29].

Also, since ICT programs in Japanese schools are dominantly laptop- or tablet-based, with robots playing only a very minor role, the differences in utility between these platforms also remains unclear.

In this case study, we investigate the effectiveness of intelligent robots and the differences between using a robot and traditional ICT materials.

### Methods

To investigate the effectiveness of using an intelligent robot for education of children with developmental disabilities, we created two educational applications, each

with two versions: one for Palmi, and another featuring an animated character displayed on a laptop computer (Fig. 13). These educational applications were developed following processes described by Akanuma, et al. [25].



Figure 13. Animated character.

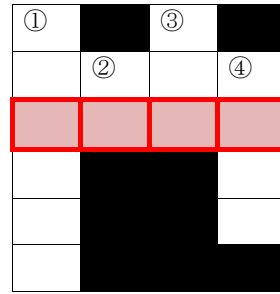


Figure 14. Sample of crossword puzzle.

One application involves an imitation task. In this program, the participant hears a series of instructions and sees Palmi, or the on-screen character. Follow these instructions by moving its arms. The participant then imitates these motions, which are always presented in a set sequence. The task is divided into five steps. In the first step, the participant memorizes and performs two motions, then three motions, and so on. For the final step, the character shows six motions to be repeated sequentially by the participant. The participant's success is determined by his/her accuracy in performing the memorized motions.

The other program is a crossword puzzle, for which Palmi, or the on-screen character, gives the participant cues. The participant writes the answers in a puzzle grid (Fig. 14). After responding to all the items, the student says the word formed by the letters in the red squares. Participants are provided five puzzles. We observed their approaches to the problems and communication with Palmi or the on-screen character.

Experiments were performed in the period between January 13th and 30th, 2017. Eight students participated. All participants played the imitation game and the crossword puzzle twice each. The first time, Palmi provided the support, while the on-screen character was used the second time. We evaluated differences in effectiveness by comparing the number of memorized motions and accuracy rate for the imitation task, and observing the questioning process employed in completing the crossword task.

## Results

Figure 15 shows the average accuracy rate for all five steps constituting the instruction imitation activity. Participants scored a significant ( $p < .05$ ) 8% lower when using Palmi.

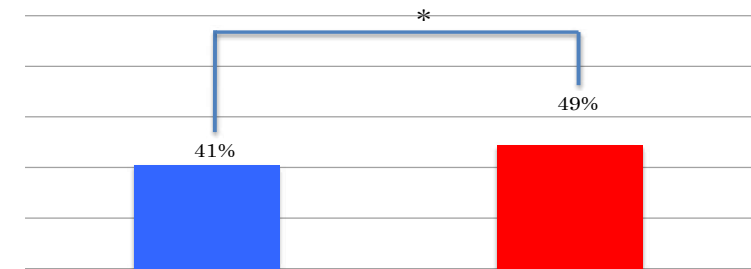


Figure 15. Overall accuracy rate for instruction imitation game: Palmi (left), On-screen character (right).

In regard to this result, one cause may relate to speed of speech. Palmi's quick speech rate made it difficult for participants to catch instructions precisely. Another, probably more interesting and important factor, was participants' lack of concentration when working with Palmi. They seemed too interested in the robot itself to concentrate well on the problems. While this attraction did not result in improved results, we believe that it may prove a significant benefit in helping students to "stick with" their studies with Palmi. In fact, detailed questionnaire results show that participants wanted to continue with Palmi. In this way, intelligent robots may offer advantages over traditional ICT methods for children with learning disabilities and other children, as well.

We analyzed crossword puzzle performance by observing the participants' approaches to the task and their communication with the machines. Data collected show that participants spoke more frequently when working with Palmi than with the on-screen character. Additionally, we compared the two methods by evaluating speech content. Words used in addressing Palmi were more familiar and intimate than those used with the on-screen character. Moreover, some participants treated Palmi like a child, patting the robot on the head or clutching it in a tight embrace. These behaviors reflect the sense of direct contact with the robot in real space, which cannot be duplicated with a character on a monitor.

Through this study, we learned that intelligent robots, such as Palmi or Pepper, may have particular utility for education involving direct contact with the learner, thus providing familiarity and affinity leading to continued study. This suggests that robot-mediated learning of social skills may also have potential. This is especially important as children with development disorders tend to struggle with social skills, causing isolation from society and impairing mental health.

## Discussion

We have here presented two case studies illustrating the potential utilization of an intelligent robot, Palmi, in providing recreational activities for elderly people and education for children with learning disorders.

In the first case, we examined the possibility of using robots to help relieve the burden on over-stretched care-givers dealing with Japan's aging population. We programmed Palmi to lead a recreation session for elderly participants in the day-service facility of "Sendan-no-Yakata." Results show that elderly people can accept a robot and recreational activities led by it. While this suggests the likelihood of a surge in demand for robots in this area, the study also highlights difficulties demanding further development of software and the robots themselves. Particularly, artificial voice technology and voice recognition require improvement.

In the second case, we assessed the effectiveness of robot-provided instruction for children with learning disorders by comparing students' work with Palmi vs. an animated character displayed on a laptop monitor—a more traditional ICT method. We found no difference in performance on an imitation task when using the robot vs. an animated character on a laptop screen (in fact, the opposite was true). However, feedback from the children suggests that training with a robot would likely result in longer-term engagement due to a sense of affinity related to their ability to communicate with and touch the robot directly in real space. This also suggests the possibility of using robots to help students to learn social skills.

Interestingly, our findings suggest that the ability to talk somewhat "naturally" with robots (first case study) and have direct physical contact (second case) may yield mental health benefits. With the increasing mental health challenges we face as a society, these are encouraging signs.

Of course, we must admit our inexperience related to manipulation of intelligent robots, and this work will require much further study. These studies also make it clear (e.g., problems recognizing dialects) that our current intelligent robots may, contrary to popular imagination, require much more development before they are practically useful for many applications in the welfare and education fields.

The improvement of AI involves a mutual, interactive process in which machines make mistakes and we continually correct and coach them. As a result, we have developed today's superior AI technology, with the accuracy and speed to often outstrip human intelligence. Encouraged by this, we should continue to develop and utilize robots in the areas of service, welfare and education, and in wider fields using similar concepts. This promises to yield something completely new, which cannot be obtained only by humans or only by robots, but through human-robot cooperation.

### Acknowledgments

We are grateful to S. Akanuma, K. Ishimoto, S. Sasaki, T. Sasaki, A. Chiba, and R. Nakano, our students at TFU, for their efforts, which contributed greatly to the work presented here. M. Oouchi and J. Urushiyama also extend their appreciation for a special grant for research and education from Tohoku Fukushi University. Finally, K. Iwata acknowledges support through JSPS Grant Number JP18K13240.

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Paula Lehto

## DESCRIPTION OF COCREATION PROCESS WITH ELDERLY PEOPLE AND HOMECARE WORKERS TOWARDS ROBOTICS IN ELDERLY CARE

### Introduction

There are lot of challenges ahead regarding how to tackle the questions of ageing society and ageing population in European countries and Asian countries. The demand is to develop and create new health technology and robotics in the context of elderly care. The purpose of this article is to focus on the Robotics and Future of Welfare Services (ROSE) research and development process as a context, which is aiming to study robots in elderly care with elderly people and homecare workers. The aim is to present a living lab study about how care robots can be applied in the the elderly care context and present how cocreation is implemented in the data collection process. The methodological background is on action research and living lab methodology. The design of the pilot in Rose was based on a cocreation process. The data was collected through the triangulation.

Digitalization and robotics are actual challenges in the health care and social welfare fields (Digital Agenda in Europe 2012.) Based on earlier studies the main elderly people’s problems are loneliness, unsafety and lack of mobility. By applying robots to support elderly people’s health and well-being and coping at home for using and offering robots as accompany for the elderly people or robots as supporting their cognitive functions through interactive and quided games or other activities via robots, might decrease loneliness and promote their mental health.



The basis of this article is based on the study that is a part of Robotics and Future Welfare Services (ROSE) research project. The ROSE project adopts a multidisciplinary approach to study how advances in robot and perception technologies allow product and service innovation and renewal of welfare services to respond the needs of the elderly people. The data collection process and the findings presented in this article are the basis for the design and cocreation towards the pilots of robots based on living lab approach in the ROSE project (roseproject.aalto.fi).

## Background

The project “Robots and Future of Welfare Services” (ROSE) is funded by Strategic Research Council, Academy of Finland. The consortium partners are: Department of Electrical Engineering and Automation, Aalto University Department of Signal Processing, Tampere University of Technology, School of Social Sciences and Humanities, University of Tampere, Business ecosystems, value chains, foresight, VTT Technical Research Centre of Finland, Laurea University of Applied Sciences and School of Business and Management, Lappeenranta University of Technology. The project is coordinated by Aalto University and is carried out during the years 2015-2020.






The project adopts a multidisciplinary and holistic approach to study how advances in robot and perception technologies allow product and service innovation and the renewal of welfare services, when services are developed jointly with users and other stakeholders. In addition, the new services via robotics require to study of ethical issues and stakeholder participation. The content of the ROSE acts on three levels: Individual level (human-robot interaction, ethics), Service level (welfare services with robots in different roles) and Society level (societal acceptance, renewal of service systems). (roseproject.aalto.fi)

## Examples of robots in health care

Robots in health care and social welfare context can be divided into medical robots, institutional robots, personal assistive robots and care robots. Robots can be named based on different characteristics and functions for example care robots, service robots and social robots (Kangasniemi, Pietilä & Häggman-Laitila 2016). Robots are designed for moving or lifting a person, monitoring elderly people, for example, or reminding elderly people of medication. Robots are able to enhance remote online connection, interaction, discussions or playing games (Kachoe, Sedighadeli, Khosla and Chu 2014) (Table 1).

According to earlier studies and the literature, there are many positive attitudes towards robots, especially robots related to heavy, dangerous and difficult works and tasks. Based on survey of Eurobarometer (2012) most of the informants accept the robot doing everyday hard work but do not see the benefits of the robots in health care or for their own personal.

**Table 1.** Types of robots in health and social care field (Kyrki et al. 2015)

<b>MEDICAL CARE</b>	<b>SURGICAL ROBOTS</b>	
<b>HOSPITAL LOGISTICS</b>	<b>HOSPITAL LOGISTICS ROBOTS</b> <b>PHARMACY IN HOSPITAL</b> <b>DELIVERY OF PHARMACEUTICAL</b>	
<b>REHABILITATION</b>	<b>ROBOTIC REHAB EQUIPMENT</b> <b>ROBOTIC PROSTHETIC LIMBS</b> <b>EXTERNAL BODY SUPPORTS</b>	
<b>PERSONAL PHYSICAL ASSISTANCE</b>	<b>EATING (E.G. ROBOTIC SPOON)</b> <b>MOVING AND EXERCISING</b> <b>LIFTING AND CARRYING THINGS</b> <b>CLEANING</b> <b>COOKERY</b> <b>DRESSING</b> <b>HYGIENE</b>	
<b>PERSONAL COGNITIVE AND SOCIAL HELP</b>	<b>SUPPORT FOR SELF CARE (E.G. MOTIVATION FOR EXERCISING)</b> <b>COMPANION</b> <b>SUPPORT FOR INTERACTION (TELEPRESENCE ROBOTS)</b> <b>COGNITIVE SUPPORT (E.G. REMINDER, FINDING THINGS)</b>	

The challenge is still to study and develop the interaction between robots and individuals especially in elderly care contexts. There is still a huge need to develop new ICT applications, solutions and services especially for using service robots and care robots in elderly care.

## The purpose and research questions

The purpose of this article is to describe actors' participation in the cocreation process in the context of the ROSE project. The aim is to present how elderly people

and home care workers are involved in the data collection process for planning the pilot studies about how to apply robots in elderly care. The research questions are:

How can elderly people and home care workers participate in the co creation process of an action research ?

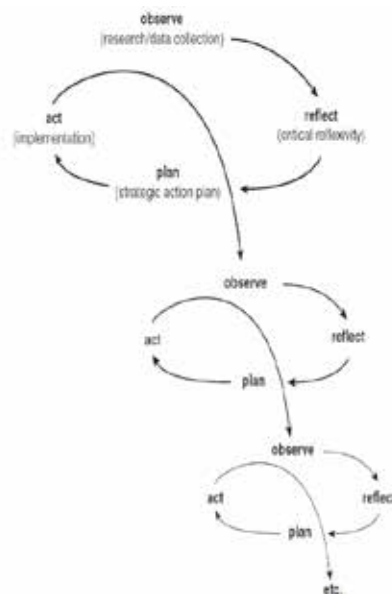
How participants describe the present situation in the elderly home care?

What are participants' conceptions and ideas about using robots in elderly care?

## Methodological background

The role of Laurea University of Applied Sciences in the ROSE study is based on Action Research and the Living lab methodology. According to the literature, action research can be seen either as methods or as a methodological approach (Moore, Crozier & Kite 2012, Reason & Bradbury 2008). Action research is grounded on critical knowledge interests (Kyrö 2004, Habermas 1972) and it aims to produce new knowledge and new models for practice. The basic principles of action research are practicality, actors' participation and the creation of new activities or interventions related to the concept of change. The cyclic process of the action research is strongly anchored in real life (Reason & Bradbury 2008) (Figure 1).

Action research is used in real life situations rather than in experimental study contexts, since the primary focus of action research is on solving real problems. In the ROSE project action research is applied in the elderly care context in a small



**Figure 1.** The cycle of the action research (Reason and Bradbury 2008)

community in the southern part of Finland in order to develop new services via robotics for and with the elderly people.

In the ROSE project, Living lab is also applied as a methodological background. Living lab is a network that integrates user-centred research and open innovation (Leminen & Westerlund 2011). Living lab offers a new environment for testing and piloting new and future oriented interventions, methods or applications based on users' experiences in real life situations through a cocreation process (Leminen 2015.)

Leminen and Westerlund (2012) define Living labs as physical regions or virtual environments where public-private-people -partnerships, companies, academic institutions and users create, test and validate new products and services in real life. A Living lab methodology and user-driven methods integrate various actors in solving real life problems and support co-operative networking and cocreation with working life and real clients. Elderly care and homecare as living labs are the contexts in this ROSE project and enable the planning and conducting of the pilot study process with real participants such as elderly people and homecare workers.

## The data collection process as a cocreation process

The aim of data collection during the first phase of the ROSE project was to find out and identify the present situation of homecare and to map out the elderly people's current problems. The data collection during the first phase included service design methods such as visual prints for describing the content of home visit and used daily-based time. Home care workers (n=34) as participants described their work based on one of their usual home visit. They showed the content by filling the visual print of layout of home and then wrote what was the daily work at elderly people's home (Figure 2). Participants also reflected and structured their own thoughts about how to apply and use robots in home care based on the Strengths, Weaknesses, Opportunities and Threats (SWOT).

The second phase of data collection focused on how to apply robots in the elderly care context. The data was collected through the focus group interviews in which both elderly people and homecare workers participated. The data collection was based on focus group interviews. The participants were same homecare workers as mentioned above. The interview themes were based on the questions: on how to apply robots in home care and what kind of the ideas of robots home care workers have.

The third phase of the data collection started by demonstrations with the five different robots (Pepper, Paro, NAO, Double and Logistic robot Wihi). The discussions were organised in four joint focus groups of elderly people and homecare workers. Elderly people (n=12) and home care workers (n= 6) participated in this data collection process. The data was tape-recorded and video-recorded.

## Asiakkaan koti

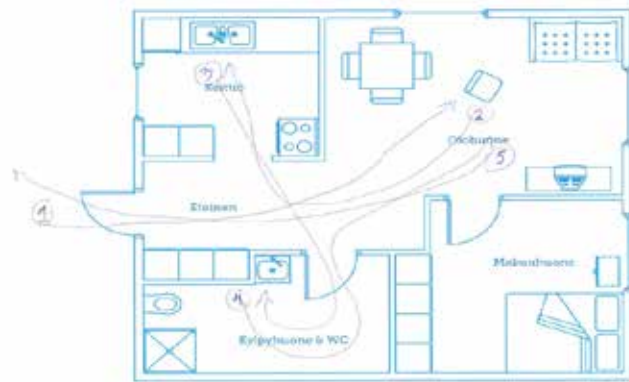


Figure 2. Data collection via a visual print (layout of home)

The elderly people (n=30) and home care workers (n=40) were actively participating in the data collection process. Nearly all of the participants were committed in the discussions in the focus groups and demonstrations. There were only two elderly people and one homecare worker who did not want to participate actively in the discussions but wanted to join the session. The participants were interested in reflecting their thoughts and ideas on how to use robots in elderly care. They were keen to see, for example, how the five robots were acting and what are the possibilities to get more knowledge and to be more familiar with the robots.

The benefit of using triangulative data collection methods offered multiple and rich data. Also through these data collections both elderly people and homecare workers had the possibility to familiarise themselves with robots. The data was analysed using qualitative inductive content analysis (Dey 2003, Patton 1993.) The stakeholders gave the ethical permission for the study from the community. All participants wrote informed consent. (TENK 2012)

## Findings

### The present situation of homecare

Homecare workers' descriptions of the present situation in homecare were grounded on the data on visual prints, SWOT and focus groups. Based on the data analysis the main themes as categories are: client in homecare, circumstances in homecare environments, and episodes of homecare visit, used time and challenges of homecare. As the findings of elderly people's present situation and problems are poor health and well-being, loneliness and unsafety and lack of mobility. The elderly people have several illnesses and problems. There are more and more elderly people with memory problems and dementia. Loneliness and unsafety were mentioned often in the data. Many of the elderly people who are living alone are distressed and have fears about

copied at home. There is a need for more and more help and support. In addition, elderly people's spouses are often unwell and have problems coping at home. Other family members have many worries about how their own e.g. parents are coping at home. Circumstances in the home environment, activity of daily living and other conditions at home are often difficult and challenging. The contents of the homecare work such as episodes in home visits and allocation of time are demanding.

"Well if there is a sudden attack and or client has fallen down and you must wait for another person to help or lift them or sometimes you must ask help from service house if they have time to come and it will take time."

Table 2. Summary of the findings from different data collection phases

PARTICIPANTS	DATA COLLECTION METHODS	MAIN THEMES	MAIN SUB CONTENTS	IDEAS FOR USING ROBOTS
HOME CARE WORKERS (N=34)	VISUAL PRINTS SWOT FOCUS GROUP INTERVIEWS	PRESENT SITUATION AT HOME CARE  ELDERLY PEOPLE'S PROBLEMS NEEDS OF HOME CARE  ATTITUDES	CLIENTS' POOR CONDITION LONG DISTANCES LACK OF TIME HURRY WORRIES: ELDERLY PEOPLE'S LONELINESS UNSAFETY, COPING AT HOME FEARS UNKNOWN TECHNOLOGY LEARNING	MONITOR ALARMS REMINDER RELEASE WORK (LIFTING, DRESSING) ONLINE CONNECTION GUIDANCE GYM REHABILITATION ACCOMPANY READING MUSIC BINGO
ELDERLY PEOPLE (N=14+4)	OBSERVATION INTERVIEWS	OWN LIFE HISTORY  PRESENT HEALTH AND WELL-BEING ACTIVITIES OF DAILY LIVING ROUTINES	OLD MEMORIES  LONELINESS  DIFFICULTY TO GO OUTSIDE HOME  SOCIAL CONTACTS	MEMORY BOX (PAST-PRESENT)  ACTUAL NEWS READING DISCUSSIONS  HOBBIES REMINDERS EMAIL READING CONTACTS
ELDERLY PEOPLE (N=12) HOME CARE WORKERS (= 6)	DEMONSTRATIONS: FIVE ROBOTS VIDEOS FOCUS GROUP INTERVIEWS	THOUGHTS OF DEMOS	QUALITIES: FUN HUMAN SOFTNESS ATTITUDES: CURIOSITY FEARS ODDNESS AND STRANGENESS TECHNOLOGY	ASSISTING TASKS REMINDERS READING MUSIC BINGO GYM

### The ideas for using robots in elderly care

There were a lot of discussions and ideas about how robots and especially how social robot Pepper and its programme can be developed and applied in elderly care and in homecare. (Table 3)

**Figure 3.** Ideas how to use robots in elderly care

CHALLENGE/ PROBLEM	IDEA	PLAN FOR ROBOT
LONELINESS ISOLATION	ACTIVATION GAMES READING MUSIC	DESIGN READING AND DISCUSSIONS NEWSPAPER WITH PEPPER
MEMORY PROBLEMS	REMEMBERING PERSONAL LIFE HISTORY	DESIGN OWN PERSONALIZED MEMORY BOX (LIFE HISTORY, PHOTOS, PLACES ETC.)
LACK OF RELATIONSHIPS	ONLINE DISCUSSIONS (FRIENDS, SIGNIFICANT OTHERS)	INTERACTIVE CONTACT BY ONLINE VIDEO
LACK OF COMMUNICATION AND USING COMPUTERS	LEARNING AND SUPPORT VIA PEPPER	ROBOT GUIDES HOW TO USE E.G. TV
DAILY ROUTINES	REMINDER	ROBOT REMINDS THE DAY, TIME, DINING ETC.

Students from Laurea UAS participated in the data collection including interviews and observations of the elderly people in Living lab environments. From the findings, two pilots with the Pepper robot were chosen and they were BINGO and GYM. During the joint course of “Research, Service robots and Concept Development” in the Master Degree Programme students with professionals, researchers, entrepreneur and with the elderly people designed, planned and implemented two pilots during spring 2017.

## Challenges

For the future, the challenge will be discovering how the elderly people and home-care workers will be able to use robots. Applying robots with and for the elderly people might be one answer to response elderly peoples’ loneliness, unsafety and lack of mobility when promoting their health and well-being and coping at home. The challenge is how the elderly people and homecare workers as users are able to get robots in their own environments and in real life situations. The challenge is also to design and cocreate together more new contents and services using robots in health care and social welfare context. There is a need to study more Livinglab methodology when piloting and testing robots with and for the elderly people living in their own homes or in care settings. Future research is needed from the educational point of view e.g. what kind of new competences will be needed for enhancing and widening the use of robotics in health care and social welfare fields. International cooperation and research would also be useful and beneficial for transferring robotics in elderly care and in academic education. More studies are needed about ethical issues and from the cocreation point of view.

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Taku Hiraizumi

## VIDEOCONFERENCING PSYCHOTHERAPY AND COMMUNITY CARE IN JAPAN

**T**elepsychotherapy, or videoconferencing psychotherapy (VCP), is a type of psychotherapy offered via videoconferencing tools that has the potential to transform psychological services being offered to clients in the healthcare, education, welfare, corrections, and industrial sectors.

In this paper, the author will review the current state of VCP and then describe the VCP project (VCP) on which the author has been working. VCP is a project involving a university laboratory and corporations working together to build an infrastructure allowing individuals who find it difficult to appear in person for counseling sessions to receive psychological services without expending the time and effort needed to physically come to the venue. It includes... (1) education and training on VCP for counsellors as well as a guarantee of service quality, (2) examples of intervention with patients through VCP, (3) consultation with staff members who provide welfare services, (4) depression prevention programs for the families of patients requiring long-term care, and (5) the provision of psychoeducation for individuals with physical and mental disorders.

### What is videoconferencing psychotherapy?

The base of VCP is telepsychology, composed of psychological support services provided between two geographically remote locations using information

and communication technologies (American Psychological Association, 2013). Telepsychology includes a broad range of services employing an array of telecommunication technologies, such as interactive teleconferencing, telephones, texts, emails, online services, and mobile applications (Barak and Grohol, 2011; Andersson, 2016). One sector of telepsychology is VCP, which uses videoconferencing tools. Generally, with VCP, a client connects to a videoconference system from his or her home, and the connects from a counselling room. After confirming the security and safety of the communications environment, the parties engage in a therapeutic dialogue similar to that carried out in a normal counselling session.

A concept that closely resembles telepsychology is e-mental health, or the provision of mental healthcare via the Internet (Eysenbach, 2001; Vincenzo, 2001). There is also a high-level concept, known as e-health, currently being advocated in medical and health sciences (Ekeland, Hansen, and Bergmo, 2018). It should be noted that whereas e-mental health characteristically employs the Internet, telepsychology includes tools other than the Internet, such as the telephone.

### Evidence and advantages

Although some professionals are skeptical of VCP, there is, nevertheless, evidence of its efficacy, as well as compelling practical advantages. Backhaus et al. (2012) comprehensively reviewed studies on VCP, and stated that remote-style psychotherapy is as effective as the face-to-face version. Moreover, they found no differences in psychotherapeutic process variables, such as closeness/intimacy, degree of satisfaction, and expectations. Barak, Hen, Boniel-Nissim, and Shapira (2008) conducted a comprehensive review and meta-analysis of the effectiveness of Internet-based psychotherapy, and found no differences in efficacy among 14 studies comparing the effects face-to-face intervention and remote psychotherapy sessions. In one study, the degree of satisfaction with VCP was shown to be higher than with face-to-face psychotherapy, principally because accessing VCP was less burdensome than traveling to a counselling facility. For those living in rural areas, the costs in time and effort, as well as fuel costs of driving two hours each way for a counselling session in the city can be prohibitive. Thus, clients not in easy reach of counselling facilities may prefer VCP, which entails no transportation costs, to face-to-face counselling.

VCP's strength, as pointed out by Rummell and Joyce (2010), is that it enables people in a greater number of regions to access healthcare and services specializing in specific types of treatment. For example, for a client suffering from a rare mental disease, this could be his only chance at an accurate diagnosis and appropriate treatment. Using VCP, clients may be able to receive, in remote locations, services specially designed for their specific disabilities. As seen above, clients with limited mobility can receive optimal treatment from health professionals specializing in their specific disability.



## Application examples and innovations

VPC has been applied in a wide variety of cases, including treatment of anxiety disorders and depression; schizophrenia; PTSD suffered by retired military personnel; and treatment of patients with cancer and various disorders (eating, obsessive-compulsive, personality, and attention deficit-hyperactivity). It is also being used to screen cognitive function disorders and juvenile dementia. (For detailed application examples, see Simpson, 2009; Backhaus et al., 2012; and Gross, Morland, Greene, and Acierno, 2013.)

VCP has the potential to transform traditional psychotherapy. In particular, it has affected the internal and external processes of psychological interviews (Fairburn and Patel, 2018). One such change involves “joint attention” in the interview process. After a client and his/her therapist agree to have their sessions recorded, they can view past sessions together and review them (Photo 1). A second change is that as a dialogue’s sound and images can be simultaneously observed, the reflecting process can be performed with ease (Photo 2). The reflecting process (carried out by the “reflecting team”) is a method developed by Andersen and his colleagues in northern Norway. It is being employed in clinical psychology and in numerous contexts designed to foster creative conversations. In the reflecting process, a therapist and his/her client, as well as a third-person observer, try to solve problems by providing feedback on each other’s opinions and generating a different round of exchanges. The concept known as “reflection” is not limited to a mere technique but is also related to conversations, interpretations, and even language itself. Indeed, it



**Photo 1.** Image of a VCP session



**Photo 2.** Example of the reflecting process  
(The photos show individuals participating in the VCPP.)

is exerting a strong influence on narrative and other post-modern therapies. Third, VCP has the potential to change psychotherapeutic training. Using videoconferencing, a supervisee (e.g., a graduate school student) can block the visual signal and take part in his/her supervisor’s sessions. Supervisees can also have supervisors view their recorded interview videos and receive advice. Fourth, VPC also allow study of the interview process. Videos that have been recorded, with clients’ permission, can be accumulated as Big Data, and the interview process scientifically investigated and elucidated. VPC allows visualization of therapy sessions that, until now, were like a “black box”, inaccessible from the outside. This capability is expected to lead to significant advances in psychotherapeutic education, training, and research.

## Barriers to application: guidelines and ethics

Despite a growing body of evidence confirming its efficacy, VCP is still infrequently used. Feijt, de Kort, Bongers, and IJsselsteijn (2018) conducted semi-structured interviews with 12 clinical psychologists, and analysed the findings. Results revealed the following fears—barriers to VCP use—on the part of therapists: (1) misunderstandings may more easily arise, (2) sessions may not yield a powerful therapeutic relationship, and (3) non-linguistic features in communication are restricted to what can be seen on screen (Feijt et al., 2018). Another important issue is how to deal with critical situations online (e.g., if a client expresses suicidal thoughts) (Perle, Langsam, and Nierenberg, 2011). Technical limitations, moreover, include the client’s ability to cut off the session at any time. In such a situation, the remote therapist is unable to intervene to ensure the client’s safety (Rummell and Joyce, 2010). When initiating remote dialogue, the therapist is also unable to fully confirm a client’s identity, leading to the risk that s/he may be lying about it (Rummell and Joyce, 2010). Besides these issues, we must consider the equipment to be used; setup of the telecommunications environment, including provider arrangements and backup means of communication; provision of education and support to users; securing a quiet physical environment; and guaranteeing confidentiality and security (see Gros et al., 2013).

Psychologists have addressed these points by establishing guidelines and ethical standards for the appropriate introduction of VCP. Koocher (2007) illustrated the need for psychologists employing VCP to focus on four Cs: contracting, competence, confidentiality, and control. The American Psychological Association (2013) issued guidelines for practicing telepsychology. Sansom-Daly, Wakefield, McGill, Wilson, and Patterson (2016) also reviewed guidelines for appropriately implementing psychological support with videoconferencing tools, and highlighted the need for additional rules dealing with maintenance of confidentiality, informed consent, licenses, maintenance of records, and other specific issues (e.g., securing of a private space, guaranteeing quality). Table 1 shows a summarized excerpt from the APA’s Eight Guidelines—the most commonly accepted framework. For brevity, items on secrecy/confidentiality have not been included (for details, refer directly to the Guidelines).

**Table 1.** Eight guidelines (partially excerpted; a summary)

<p><b>COMPETENCE OF THE PSYCHOLOGIST: PSYCHOLOGISTS HAVE AN ETHICAL OBLIGATION TO PROVIDE PROFESSIONAL SERVICES ONLY WITHIN THE BOUNDARIES OF THEIR COMPETENCE. THEY MUST ESTABLISH A MANUAL FOR USE IN TIMES OF EMERGENCY (EMERGENCY RESPONSE CONTACTS, SUCH AS TELEPHONE NUMBERS, MEDICAL INSTITUTIONS, AND OTHER LOCAL REFERRAL RESOURCES FOR FACE-TO-FACE MENTAL SERVICES), AND ARE ADVISED TO AGREE ON THE SETUP WITH THE CLIENTS IN WRITING. TO BECOME WELL-VERSED IN TECHNOLOGIES, PSYCHOLOGISTS ARE ENCOURAGED TO SEEK SUPERVISION AND CONSULTATION FROM KNOWLEDGEABLE PERSONS AND ORGANIZATIONS ON THE USE OF TELECOMMUNICATIONS TECHNOLOGIES.</b></p>
<p><b>STANDARDS OF CARE IN THE DELIVERY OF TELEPSYCHOLOGY SERVICES: PSYCHOLOGISTS ARE ENCOURAGED TO TAKE PARTICULAR CARE TO EVALUATE AND ASSESS CONTINUALLY THE APPROPRIATENESS OF UTILIZING THESE TECHNOLOGIES THROUGHOUT THE DURATION OF TELEPSYCHOLOGY PRACTICE (INCLUDING THE IMPACT THAT IMPLEMENTATION OF SUCH SERVICES HAS ON THE CLIENTS).</b></p>
<p><b>INFORMED CONSENT: PSYCHOLOGISTS STRIVE TO OBTAIN AND DOCUMENT INFORMED CONSENT THAT SPECIFICALLY ADDRESSES THE UNIQUE CONCERNS CHARACTERISTIC OF THE TELEPSYCHOLOGY SERVICES THEY PROVIDE. PSYCHOLOGISTS ARE ADVISED TO BE COGNIZANT OF THE APPLICABLE LAWS, REGULATIONS, AND ORGANIZATIONAL REQUIREMENTS THAT GOVERN INFORMED CONSENT IN THIS AREA.</b></p>
<p><b>TESTING AND ASSESSMENT: PSYCHOLOGISTS ARE ENCOURAGED TO CONSIDER THE UNIQUE PROBLEMS THAT MAY ARISE WITH TEST INSTRUMENTS AND ASSESSMENT APPROACHES DESIGNED FOR IN-PERSON IMPLEMENTATION WHEN PROVIDING TELEPSYCHOLOGY SERVICES.</b></p>
<p><b>INTERJURISDICTIONAL PRACTICE: PSYCHOLOGISTS ARE ENCOURAGED TO FAMILIARIZE THEMSELVES AND COMPLY WITH ALL RELEVANT LAWS AND REGULATIONS WHEN PROVIDING TELEPSYCHOLOGY SERVICES TO CLIENTS/PATIENTS ACROSS JURISDICTIONAL AND INTERNATIONAL BORDERS.</b></p>
<p>(SEE AMERICAN PSYCHOLOGICAL ASSOCIATION, 2013)</p>

## Education/training and guaranteeing quality

Researchers must also comply with VCP guidelines and ethical standards, and urgently need to establish mechanisms for implementation and education. For example, Exceliebe Inc., a company involved in our VCPP, employs videophones in a prevention-oriented mental health business focusing on workers and older adults. The company has established a framework for providing education and training to counsellors, and for guaranteeing the quality of services. However, not everyone practicing VCP is focused on education/training and quality. According to a report by Finn and Barak (2010), 94% of counsellors who responded to a fact-finding survey answered that they had received no training in VCP as part of their professional education, and 44% said that experts should undergo formal VCP training.

Our VCPP provided a VCP program for four young people feeling difficulty in building their careers, and evaluated the processes and outcomes, focusing on VCP enhancements and education/training of counsellors (Hiraizumi, Ohashi,

and Katayama, 2017). In this program, the participants were able to participate in a 30-minute VCP sessions once every two weeks over a total of eight weeks (four sessions), free of charge. Participants attended a 90-minute lecture on VCP in advance of beginning their sessions. The purpose of the study was explained, as well as ethical issues involved. Informed consent was obtained from each participant. Counsellors in the VCP were professionals (with standard counselling training), and who had also undergone VCP training. Senior professional counsellors served as supervisors.

To confirm the quality of the VCP, the author and another VCP practitioner prepared a quality control check list (VCPCL) and evaluated each counselling session. The VCPCL is composed of eighteen items divided into two groups (of eight and ten) that assess appropriate and inappropriate actions in VCP. The first eight indicate fundamental contraindications (“deal breakers”) in VCP (e.g., inability to carry out the session because of insufficient preparation on the part of the counsellor [dead batteries, etc.]; inability to deal with problems with Internet apps [video stopped, voices could not be heard, etc.]). The second ten consisted of standard quality control items (e.g., extraneous sounds [telephone, doorbell, etc.] and images [people, pets, etc.] entered the scene during the session). Contraindicating items were scored in binary fashion: 0 (no problem) and x (occurred once or more). The session was considered a failure if even one item was assigned a x. Standard quality control items were scored as follows: no problems = 10 points; occurred once = 5 points; occurred more than once = 0 points. A score of more than 80 out of 100 was considered a provisional passing mark. The higher the score, the higher quality the session. Videos of each session were evaluated by the supervisor and the author, and comments were added to the VCPCL General Comments column as feedback. The evaluators’ rate of concordance on VCPCL scores was 0.94, and the average VCPCL score was 90.95. To ensure and confirm the quality of VCP, it is important to clarify appropriate and inappropriate responses and actions on the part of the counsellor, as well as things that a counsellor should prepare as a matter of course. Self-inspection and objective evaluation by a third person are also necessary.

Hiraizumi, Ohashi, and Katayama (2017) performed a simple interview with, and administered a questionnaire to, the participants, and conducted a simple interview with the counsellors. Based on the results, they identified key points of expertise and communication tips for VCP (Table 2). The challenge, going forward, is to compile points of expertise and advice from counsellors and present those which are unique to VCP as a coherent set of instructions.

**Table 2.** VCP: Characteristics and communication tips

REMOTE PSYCHOTHERAPY AND FACE-TO-FACE PSYCHOTHERAPY DIFFER IN TERMS OF THE ENVIRONMENT AND STYLE OF COMMUNICATION, BUT ARE EQUIVALENT IN TERMS OF PERCEPTIONS AND MIND-SETS, AS THEY BOTH INVOLVE HUMAN NATURE, AS WELL AS MONITORING THE OTHER'S EMOTIONAL TEMPERATURE AND MENTAL STATE.
TO OPTIMIZE FOCUS AND CONCENTRATION DURING THE SESSION, IT IS IMPORTANT TO MINIMIZE TECHNICAL PROBLEMS (E.G., SOUND CUTTING OUT, REACHING A DATA LIMIT). EVEN IN THE BEST CIRCUMSTANCES, PROBLEMS CAN OCCUR (E.G., LIMITED INTELLIGIBILITY DUE TO A POOR CONNECTION, INTERNET AND APP FAILURES). THEREFORE, COUNSELLORS MUST USE THE VCP SYSTEM REGULARLY, TROUBLESHOOT, ESTABLISH PROCEDURES TO DEAL WITH PROBLEMS (WHO TO CONTACT, ETC.), BUILD EXPERIENCE WITH ONLINE SESSIONS, AND REVIEW/REFLECT ON THESE EXPERIENCES.
AS THE PARTIES ARE NOT IN PHYSICAL PROXIMITY, PARALANGUAGE THAT CREATES AN INTIMATE CONNECTION PLAYS AN IMPORTANT ROLE. FOR EXAMPLE, SLOW, EMPHATIC BODY LANGUAGE (E.G. NODS) AND INTERJECTIONS SHOW THAT YOU ARE LISTENING.
IN FACE-TO-FACE PSYCHOTHERAPY, OBSERVATION OF THE CLIENT CAN BE PROBLEMATIC, AS THE CLIENT CAN EASILY TRACK THE COUNSELLOR'S EYE MOVEMENTS. WITH VCP, HOWEVER, THE COUNSELLOR'S EYE MOVEMENTS ARE MUCH LESS OBVIOUS TO THE CLIENT, MAKING OBSERVATION EASIER. ALSO, THE COUNSELLOR CAN PICK UP KEY NUANCES IN THE INTERACTION AS S/HE OBSERVES THE CLIENT AND HIMSELF/HERSELF ON THE SCREEN SIMULTANEOUSLY.
CLIENTS WHO ARE NOT COMFORTABLE MAKING DIRECT EYE CONTACT WITH A COUNSELLOR IN A FACE-TO-FACE SITUATION MAY FEEL MORE AT EASE AND FIND IT EASIER TO TALK REMOTELY.

### Case study: VCP with a socially withdrawn individual

The author has undergone training in solution-focused brief therapy, and is thus familiar with using videoconference tools as a resource in problem solving. Below is a description of the case of a young man who, after not attending school and eventually dropping out, fell into a socially withdrawn state that lasted two years. Midway through our sessions together, the author adopted a videophone tool and initiated VCP with him. Social withdrawal is defined as a state in which an individual has cut all social interactions for a period of six months or longer. In Japan, many young people and their families are saddled with the problem of social withdrawal.

The Clinical Practice Guidelines in Pediatric Medicine (Wakashima, 2016) recommend that assistance for socially withdrawn individuals include two stages: family support and home-visit support. In the first phase of support, the therapist examines communication between the client and his/her family, works to decrease extreme imbalances in bonds/relationships and power/force and encourages the patient to talk frankly with his/her family, or intervenes to halt any vicious cycle of violence and abusive language. In the second stage, after a foundation has been built allowing the individual to discuss matters with his/her family, the therapist decides on a future course of action and supports the patient and his/her family in starting

to move forward. In this particular case, during the first phase, through family interview sessions, the author aided the family in ending the vicious cycle of mutual verbal combat and excessive interference into which the patient and his family had fallen. The author then provided psychological support through face-to-face sessions with the patient. In the second stage, the author introduced remote interviews with the patient, with the aim of activating his constructive behavior through VCP.

In line with American Psychological Association guidelines (2013), the author obtained consent from the underage patient and his guardians to publish information about his case, while disguising his identity as much as practical to protect his privacy. An outline of the case is offered here:

*Early stage: The mother bitterly complained, "My son says that he'll study but he doesn't at all [...]. He plays video games all day long [...]. Once he snaps, he spends endless hours accusing my husband and I; that the way we raised him is the cause of the problem [...]. If things are left as they are, he'll withdraw from society forever."*

*The client, for his part, insisted, "My mother interferes excessively, and whenever I try to do something, she anticipates and tells me how to do it or does it herself; this is so stressful."*

*The counselor (author) met the mother and her son together for an interview session, heard what both sides had to say, and clearly showed them that their mutual assertions and behaviors had developed into a vicious cycle. On top of this, the counselor established a clear rule that they must not attack each other in word or action. As a result, although they frequently got into arguments, they gradually calmed down.*

*Middle stage: The client expressed his wish to attend a correspondence-style high school, and his parents agreed. However, this did not continue for long, and the mother began interfering with her son again. The client began verbally abusing his mother again, but the counselor tried to stop him from doing this. During the course of psychoeducation, the counselor conveyed to him counselors' view that he possessed both high and low self-esteem at the same time, and that adolescents tend to be both narcissistic and over-sensitive (They think too much and become unable to act), and supported his efforts to break out of this state. The client agreed, and told me of his wish to work on his inability to take action and his depressive state. The counselor confirmed the presence of a vicious cycle—that his inability to take action was making his depression persist—and assisted his efforts to take action.*

*Later stage: Using activation of behavior as the focus of our therapeutic goals, the counselor suggested using VCP to frequently monitor his behavior. The client agreed. In VCP sessions, the counselor and the client focused on his daily activities, such as going out, the time that he got up in the morning, attending correspondence high school, and engaging in physical exercise (running). They continued to hold VCP sessions once a week for two months. The client began to interact regularly with a teacher at the correspondence high school, and decided on his own to apply for university entrance. As a result of his increasing efforts, he succeeded in passing the examination. After providing follow-up sessions once every two months, the counselor confirmed that he was able to continue attending college, and ended the therapy. To date, he has not requested any further psychotherapy sessions, and is leading his life as a university student without any apparent problems.*

In this particular case, we were able to realize behavioral activation through weekly VCP sessions. Li, Jaladin, and Abdullah (2013) discussed the usefulness of VCP in



intervening with clients suffering from social phobia. In the case above, VCP allowed the counselor to hold frequent sessions with a client whose inability to take action caused him to remain in a depressive state. As a result of VCP, he became able to regularly leave the house and engage with the outside world.

There is no need to assert any superiority of VCP over face-to-face psychotherapy, or to construct psychotherapeutic techniques based on VCP alone. Instead, a psychologist can form a therapeutic alliance with a client, integrate the client's needs with the psychologist's views and diagnoses, and combine face-to-face sessions with VCP as deemed necessary—while reassessing the therapeutic arrangement from time to time.

## Remote consultations

Similar to VCP is a type of consultation provided between two remote locations using videoconferencing tools. Lempicki and Holland (2017) pointed out that certain problems exist with the development of inter-professional team encounter programs, and that information and communication technologies can become a means of overcoming a number of such problems.

Another part of the VCPP involves psychologists collaborating with Manaby Inc.—a company that supports the employment of persons with disabilities—and consulting with staff members using videoconferencing tools. This part of the program aims at (1) providing knowledge and skills pertaining to the overall mental health of persons with disabilities, and (2) enabling staff members to provide individual mental health consultations. Staff members undergo individual interview sessions (consultations) with a psychologist once every two months. Examples of common consultations are as follows:

- Knowledge and understanding of disabilities.
- Responding to clients' declining motivation to engage in counseling.
- Dealing with co-workers with physical and mental disorders.

Gentry, Lapid, Clark, and Rummans (2018) systematically reviewed 40 studies on group-based videoconferencing services, and reported that group-based interventions have real potential for providing access to needed services. Few, if any, studies indicated that videoconferencing group processes were superior or inferior to face-to-face group processes. A study examining process factors found relatively few losses of therapeutic alliances among teleconference group participants. Banbury, Nancarrow, Dart, Gray, and Parkinson (2018) conducted a systematic review of group therapies employing group videoconferencing (for support groups and psychoeducation) and noted that streamed, group videoconferences are feasible, and can enhance accessibility for individuals who live in rural areas, whose movements are restricted, who are socially isolated. It may thus be possible for VCP practitioners to not only offer VCP to individuals, but also work with communities and offer group therapy and consultation remotely.

## Future prospects

Our VCPP welcomes participation by researchers and practitioners willing to comply with VCP guidelines and ethical standards, and who are aware of the importance of specialized training/education and efforts to ensure quality of service. Long-term nursing care and psychoeducation for seniors, in particular, is a fertile field for cooperation and development involving researchers and practitioners in both Japan and Finland. International teams may be able to address challenging questions such as these: (1) Is it possible to offer depression prevention programs to families who are providing long-term nursing care using a remote format? (2) Can the psychoeducation of persons with disabilities be offered via e-learning? (3) Can Open Dialog, developed in Finland, be offered remotely? (4) Can the history of a regional community be recorded, preserved, and viewed using a remote-format reminiscence method? Below, the author will describe projects that are currently underway in the VCPP.

### Depression prevention programs for family members providing long-term nursing care

Providers of long-term nursing care looking after an older family member in the home experience a high degree of stress. However, they are unlikely to seek psychological services. When a long-term care provider sends an older family member to a respite care facility outside the home, s/he would typically prefer to use the free time to clean the house, go shopping or rest at home, rather than going in for a counseling session. The time required to reach a facility and receiving counselling represents a major hurdle, both practically and psychologically. For such caregivers, VCP entails no travel costs, thereby lowering psychological barriers to the use of counselling services.

For family caregivers dealing with time and physical restrictions, the author have been developing a VCP program specifically designed to prevent the onset of depression on the part of such caregivers. Although the program has yet to be completed, significant, positive outcomes have already been seen (Hiraizumi, 2017). The author believe that these measures will serve as a model of practice for psychologists serving such long-term caregivers.

### Development of a psychoeducation program via e-learning

One program in the Japanese welfare service scheme offers transitional support for individuals with mental and physical disabilities who seek employment at ordinary corporations, and provides training in the knowledge and skills needed for such employment. One company engaged in offering such services is Manaby Inc. They provide opportunities for at-home study and employment, centred on e-learning (Photo 3).



**Photo 3.** Courtesy of Manaby Inc.

Encouraging the employment of clients with disabilities requires adjustments for the work environment and follow-up support after employment. It is also important for clients to acknowledge their disabilities and practice self-care. With this in mind, VCPP focuses on the psychoeducation of individuals with disabilities, and is working to develop e-learning content. In the future, we also envisage constructing a system that allows individuals to apply for VCP counselling, as needed, while making use of psychoeducational content. These systems have potential for application in psychological services, not only for persons with disabilities, but the general public, as well.

In this paper, the author have reviewed the evidence of the utility of VCP and described the VCP project (VCPP) which has been the focus of my work. VCP enables the provision of psychological services to individuals who find it difficult to access counselling facilities. As VCP yields therapeutic results and usability that are on par with those of face-to-face psychotherapy, it is a sector that is likely to continue to grow. In the future, it will most likely be used not only in counselling but also in psychological testing, consultation, and community care.

### Acknowledgements

This work was supported by JSPS KAKENHI Grant Number 17K13945. The author gratefully acknowledges Exceliebe Inc. and Manaby Inc. for their collaboration on our project, and thanks his client and his family for permitting the report on their case.

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Anniina Honkonen & Katja Tikkanen

## USE OF WELL-BEING TECHNOLOGY TO SUPPORT MEMORY AND COPING AT HOME

At Laurea University of Applied Sciences, well-being technology and the opportunities it provides have been developed and studied for years in co-operation with customers, experts and companies. The objective of these projects has been to promote health and well-being, support living at home and increase the use of well-being technology, particularly from the perspective of the elderly. The mHealth Booster research and development project coordinated by Laurea designed and piloted various user-driven development environments, in which well-being technology solutions developed by our co-operation partner companies were tested together with end users, companies and experts. The project resulted in the development of the Technology Library (in Finnish: Teknologialainaamo®) for easy access to well-being technology for demonstration, experimental and borrowing purposes under the guidance of Laurea's experts and students. Many of the Technology Library products, such as a tracking device built inside the shoe sole, are suitable for supporting the functional capacity of the elderly with a memory disorder and their ability to live at home. Technological aids can support coping at home, improve the safety of a person with a memory disorder, promote functional capacity and introduce pleasure and a sense of community to everyday life. This article describes the background and idea of the Technology Library and introduces some of its products that support memory and well-being.

## Background of the need to develop well-being technology

The operating environment of the Finnish social services and health care sector has changed considerably in recent years. The main factors challenging the development of our entire welfare society include the ageing of population and a less favourable age dependency ratio, the instability of municipal and public economy, increasing income disparity, globalisation, development of information society, and changes in people's everyday life and behaviour (Valtionvarainministeriö 2013, 3.) This transformation process also involves a transformation of the institutionally oriented care and service structures so that services and support are increasingly provided in the home (Sosiaali- ja terveystieteiden ministeriö 2012, 74).

The changing population structure increases demand for services. More services are needed for the elderly, but they must be provided with fewer human resources than before. This is a major challenge in terms of organising the services and also for the entire public sector economy. (Valtionvarainministeriö 2013, 3.) In addition, slower growth of production reduces possibilities for the funding of well-being. Solutions to the challenges faced by the social services and health care sector are sought from customer-driven and cost-efficient service processes, the use of technology, supported living at home, preventive services, increased focus on non-institutional services and increased emphasis on citizens' personal responsibility. The policy on the elderly is based on home care services and their development, as the national recommendations also aim to enable and prioritise living at home.

According to Pesola (2013), the increasing number of over 85-year-olds is a particular challenge: in figures, one in three over 85-year-olds has a severe or moderate memory disorder. Approximately two thirds of the citizens with a memory disorder live alone. A memory disorder, however, is a considerable challenge from the perspective of living at home. A pleasant and safe home environment is part of the care of people with a memory disorder. It is important that elderly people with a memory disorder can live in an environment which they recognise and in which they feel safe. Therefore, more attention should be paid to the safety of the home. (Pesola 2013.)

The home acts as a human asylum and supports its sovereignty. The home allows people a sense of freedom, a place where life is progressing according to their own created rhythm. At home, there is a chance to feel normal living alongside memory difficulties. The home is shaped by the state, and its familiarity with the persistence of memory disease is important. Moving from familiar home to another breaks the order in which the sick person is conceived of his home and environment. It is essential that as long as the feeling of being at home remains healthy, one needs to live well in his own home (Eloniemi-Sulkava 2007, 9.)

Also Andersson (2007) says that home is a place for many things to do, at home you can be free. Home creates identity and has social meanings. For the elderly home

often means independence. It also means place where you can do what you want, and that it is independent of other people. (Andersson 2007, 76.)

Today, there is a wide variety of aids available to make everyday life easier at home. Technological aids can support coping at home, improve the safety of an elderly person with a memory disorder, promote functional capacity and introduce pleasure and a sense of community in everyday life. For instance, the easy-to-use devices enable contacting family and friends. Solutions that improve safety include door alarms, fall alarms, stove alarms and safety bracelets. A regular rhythm of daily life is promoted by aids such as an automatic medicine dispenser, various reminders and a daily calendar. (Muisstiliitto 2016.) Well-being technology solutions may also be borrowed for testing from the Technology Library coordinated by Laurea University of Applied Sciences.

Health technology is also Finland's largest high-tech export industry. In 2015, Finnish health technology export hit a new record, EUR 1.92 billion, an increase of 6.6 per cent from the previous year. Health technology hit a record also in terms of the balance of trade, with a surplus of EUR 896 million in 2015. Over the past 20 years, export of Finnish health technology has quintupled and the trade surplus has increased tenfold. The products of the industry are not only developed but also mainly manufactured in Finland, employing more than 10,000 people. In Finland, Finnish Health Technology Association (FiHTA) Healthtech Finland is the industry's leading organisation with the strongest influence. It promotes the growth and internationalisation of companies in the industry by providing a meeting forum and developing services for the members with consideration for the special features of the industry. (Teknologiateollisuus 2016a, 2016b, 2016c.)

## Well-being technology in Finland

Well-being technology is referred to with many different terms, such as health technology, gerontechnology, age technology and technical aids. In the Finnish social and health care sector, well-being technology is specified as information technology-based and technical solutions to maintain and improve a person's quality of life, well-being or health. The multidimensional use of technology can promote a good everyday life and safety for the elderly or disabled persons and also for those close to them. Well-being technology also includes modifications to the home, accessibility and diverse information technology-based applications. (Välikangas 2006; Mäki, Topo, Rauhala & Jylhä 2000.)

Age technology is technology for the elderly, such as traditional aids for support in the areas of daily activities, mobility, seeing and hearing. On the other hand, it also covers a much wider range of technology to support satisfactory ageing, responding in many ways to the diverse needs of ageing people as well as carers and other stakeholders who provide care and support for them. (See Sixsmith & Gutman 2013; Eerola & Väyrynen 2002; Niiniluoto 2000). Thus, age technology responds to

the challenges related to ageing, such as the deterioration of the senses, perception, fine motor coordination, muscular fitness and mobility (Mäki 2011, 5).

VTKL - The Finnish Association for the Welfare of Older People (Vanhustyön Keskusliitto ry) and Valli, the Union for Senior Services, carried out the Ikäteknologia ('Age Technology') project which ran from 2010 to 2014. The project included preparing the report *Ikäteknologian kokeilut Suomessa* ('Age Technology Experiments in Finland') (2011), which listed different roles of technology that promotes living at home and a good everyday life. There are many such roles, and they are also applicable to other user groups, such as people with learning difficulties or a memory disorder. The role of technology is to support functional capacity and independent coping at home, compensate for the users' deteriorating abilities and help them to keep up their skills. On the other hand, technology also has a role in making routine work easier for carers and home help service workers, allowing more time for interaction and responding to the individual needs of the elderly. Furthermore, one of the roles of technology is also health monitoring and summoning help when necessary as well as improving safety and the feeling of security. Prevention of the harmful consequences of an uninspiring environment and social exclusion as well as promotion of engagement, interaction and inspiration are also specified as an important role in the report. Technology is also the creator of a forum for co-operation between professional carers and the family members and supports nursing and care work. In addition, it is also very important from the perspective of physical and mental rehabilitation as well as memory and identity support. (Mäki 2011, 5–6.)

### The mHealth Booster project as a developer of deployment and competence

The mHealth Booster, a project running from 1 August 2013 to 31 December 2014, was coordinated by Laurea University of Applied Sciences and funded by the European Social Fund and the Centre for Economic Development, Transport and the Environment for Uusimaa. The project promoted the use of technology products and services to support the well-being and rehabilitation of the users, as well as their coping at home and life management. The research and development project was triggered by the increasing use of information technology in health care, the increasing emphasis on people's independent health management, the increasing demand for services for the elderly, the development needs identified in the business and customer expertise of well-being technology companies as well as the lack of user-driven development environments. (Ryhänen & Lehto 2014.)

The project's objectives included utilising solutions developed by companies, enabling people to become familiar with them, testing and developing them as well as supporting the well-being of the elderly with technological solutions. Furthermore, the project aimed to promote employment in the ICT sector and promote ICT business. The purpose of the action research carried out by the project was to study, develop, design and produce development environments that utilise well-being

technology as well as assess the opportunities provided by the development environments to promote well-being, health and coping at home for customer groups representing different ages. (Ryhänen & Lehto 2014.)

The objective was to implement customer-driven development environments in which companies in the well-being branch can test their technology products and services as well as offer and sell them to customers and experts in a very low-threshold operating environment. Altogether 75 senior citizens, 29 experts and 15 young people participated in the study. In total, more than 90 companies participated in the different functions of the project. (Ryhänen & Lehto 2014.)

The project designed and piloted various user-driven development environments, in which well-being technology solutions developed by our co-operation partner companies were tested together with end users, companies and experts. In addition to testing, all the development environments were also environments of education and guidance for professionals and students working with the elderly and young people. During the project, there were four development environments. Three of them were well-being technology demonstration points for the elderly: Hyvinvointitori ('Well-being market') at the Tapiola health centre, Hyvinvointikioski ('Well-being kiosk') at the Soukka service centre and Technology Library at the Tikkurila library. One of the environments was a mobile application pilot for the Nuorten kaupunki ('City of youth') project, implemented with young people and employees from the Youth Services of the City of Vantaa.

Between January and November 2014, more than 4,200 visitors came to the demonstration points to become familiar with well-being technology. In addition, more than 400 students representing several fields of study participated in the project between autumn 2013 and autumn 2014. For the students, the development environments provided inspiring learning environments, as they could develop their skills and competence in multiple areas, such as well-being technology, encountering the customer and interacting with them, appearing before an audience, marketing, and running a business. (Ryhänen & Lehto 2014.)

From the City of Espoo's perspective, the project and development environments for their part match the definitions of the ageing policy (2009–2015) on how technology supports independent life and how information and guidance encourage citizens to use well-being technology (see Valvanne, Rysti, Kylmänen-Kurkela ja Meriläinen 2008, 26). Similarly, the objectives of the City of Vantaa's ageing policy on providing information and guidance for the elderly on the use of new technology were in line with the project's objectives and results (see Kaupunginhallitus 2010, 30).

At the completion of the project at year-end 2014, the development environments had achieved their objective to serve as impartial demonstration and testing points for various well-being technology solutions. The elderly (the target group), their family members as well as social services and health care professionals had discovered the development environments, and demonstration activities were frequent.

The operating methods piloted by the project demonstrated their usefulness and importance with respect to the research carried out as well as the transferability of the results. In particular, from the perspective of the elderly customers, the results related to the development and process of guidance and instruction have shown both public sector actors and private entrepreneurs the importance of and need for the products. The partners to the development environments, i.e. the elderly services and library services of the cities, wanted to continue the co-operation. Therefore, the Kokeilupiste testing point stayed on in Espoo and the Technology Library was permanently established in Vantaa in co-operation with Vantaa library services. (Ryhänen & Lehto 2014.)

### Technology Library provides access to products that promote coping at home

The Technology Library (Teknologialainaamo®) was developed as a result of the mHealth Booster project. It is a learning environment on Laurea's Tikkurila campus for the demonstration, testing and borrowing of well-being technology. The objective is to increase citizens' awareness of available well-being technology solutions. This promotes the well-being of the elderly and their family members as well as independent coping at home.

A further objective is to increase awareness of the technology and its use among social services and health care professionals and students. In addition, the activities aim to win more visibility for companies in the branch and to support their development. The primary purpose is not to sell products but to provide impartial information on different alternatives. (Käck 2018.)

Until the end of 2017, the introduction, testing and borrowing of well-being technology solutions was enabled by co-operation with the Helmet library. At that time, the permanent demonstration point of the Technology Library was located in the Tikkurila library in Vantaa. Some of the products could be borrowed for testing with a library card. Another permanent demonstration point was located on Laurea's Tikkurila campus. In January 2018, all the borrowing activities were transferred from the Tikkurila city library to the Technology Library. Co-operation with the Tikkurila library still continues in the form of demonstrations. (Käck 2018.)

Demonstration visits and participation in various events in the Uusimaa region are an essential part of the activities. In this context, a demonstration visit means visiting the target groups and demonstrating the products to them. A weekly 'open house' was launched as a new Technology Library service on Laurea's Tikkurila campus. Citizens can come to look at the products, test them and borrow them under the instruction of the personnel and students. (Käck 2018.)

According to memory specialists, it is recommended to learn to use suitable aids and technology solutions already at the early stages of a memory disorder to make their

use easier. The personal autonomy of a person with a memory disorder must be respected also in matters related to the use of aids and technology. The person's wishes should also be recorded in the living will. (Muistiliitto 2016.) The Technology Library offers various technological solutions related to housing and personal safety, health monitoring, self-care, functional capacity, mobility and nutrition as well as social well-being and peer support.

Co-operation with companies is active. In addition to personal contacting, customer feedback on Technology Library activities and events as well as the demonstrated products is regularly communicated to the partner companies in summaries included in newsletters and bulletins. Furthermore, the Technology Library communicates to the general public via its website, Facebook, Twitter, Instagram and the Technology Library blog. (Käck 2018.)

The Technology Library also has an important role in the education provided by Laurea. The learning environment provides a multitude of opportunities for teaching and learning for all Laurea students. There is also a particular Technology Library study unit specifically designed for related studies. In addition to this, in the Technology Library learning environment students can study in projects integrated into other study units, and the learning environment can be used for supplementary studies and work placements. Thesis writing is also possible in the environment. The Technology Library activities are an excellent way of combining theory with practice. At the same time, the learning environment provides opportunities for learning about well-being technology-related entrepreneurship, business and marketing. The learning environment also enhances students' skills of interaction with customers, professionals and other stakeholders.

### Case descriptions of well-being technology that supports people with a memory disorder and their families in everyday life

This chapter includes examples of products designed to support memory and coping at home. These products are available at the Technology Library.

#### Case 1. Yepzon GPS locators

Yepzon One is an easy-to-use locator that uses a mobile phone application for tracking. The device has a very long battery life, because it does not transmit the GPS location continuously. Yepzon One is a device with multiple uses, suitable for tracking small children, pets or people with a memory disorder, for example. The purpose is to ensure safety and peace of mind in everyday life through simple means. Yepzon Freedom is a personal, independent safety device. With the press of a button, it sends the person's location to the chosen telephones, showing the exact location both outdoors and indoors. The device works as a locator or just as an SOS button. Yepzon Freedom is suitable for young and elderly people who want to enhance their



personal safety. Currently there are approximately 20,000 users of Yepzon One and Yepzon Freedom locators around the world. (Mustonen 2017)

Twenty Yepzon One locators were experimented in Varkaus starting in January 2015. The target group consisted of customers of professional home carers and family caregivers and customers' families. Yepzon One enabled and supported the independent life of people living alone, both inside and outside the home. The purpose of the experiment was to support their physical and social functional capacity. Being able to meet friends without an escort has been important for many of them. Stress levels decreased in people with a memory disorder when they used the device, and many of them found the device very handy and important for them personally. Some of them felt that their self-esteem had improved. (Ilonen 2017.)

Family members living in the same household with the person carrying the Yepzon One locator found that they had more time to use for other purposes. In particular, the feedback from family members emphasised the reduction of worries, concerns and continuous stress and tension. Life also became easier for family members who were still in working life, as the tracking allowed them to focus on their work, engage in hobbies and be on holiday with a more peaceful mind. Anyone who got lost was found significantly more easily and efficiently. When the lost person was found, the encounter was more composed, without accusing or making the person with a memory disorder feel guilty. Even now that the experiment is over, users of the Yepzon One locator include people who participated in the experiment in winter 2015. For society, this has meant significant savings, as the next step for these customers would have been a bed in a 24-hour service housing unit. (Ilonen 2017.)



**Figure 1.** The Yepzon GPS locator and mobile phone application (Photo: Yepzon Oy)



**Figure 2.** Safera Airis stove guard (photo: Safera Oy).

### Case 2. SAFERA Airis stove guard

The SAFERA Airis stove guard identifies the risk of stove fire, sounds an alarm and, when needed, disconnects the cooker power before the fire occurs. SAFERA stove guards meet the European standard EN 50615 for stove guards; Safera Oy actually participated in the development of the standard with the authorities and industrial manufacturers. Safera stove guards are available as independent units and integrated into the cooker hood. Over 70,000 devices have been sold in the Nordic countries so far. (Rantakokko 2017.)

The Lahti Foundation of Housing and Services for the Elderly is a provider of housing and services for the elderly and people with special needs in the Lahti region. The foundation has installed SAFERA stove guards in a number of housing units to improve the occupants' safety. A stove guard is now found in approximately three hundred of the foundation's apartments, and the foundation is going to install stove guards in all new housing units. Property Manager Markku Tyrväinen from the foundation knows the safety risks associated with stoves and the importance of the stove guards for the foundation. 'A very common course of events is that a person switches the cooker on to prepare a meal but then lies down to take a nap, for example, without switching the cooker off. The stove guards were installed without problems and the occupants have been happy with them. Their family members have been particularly relieved. We have already had a few incidents in which the alarm has gone off, so the stove guards have delivered.' (Safera 2016).

### Case 3. Memoera Trainer

Memoera Trainer, developed by Solentium Oy, is an easy-to-use device with cognitive exercises designed to activate the memory and brain. The device includes various games, problems and exercises designed and tested with people with a memory disorder. Games were developed taking into consideration the different stages of memory disorders. They activate multiple sensory modalities and brain functions. The games include tasks that involve verbal, mathematical, deductive



**Figure 3.** The new appearance of the Memoera Trainer device (photo: Solentium Oy, photographer: Pihla Rostedt).

and memory skills. Each game or problem is preceded by video instructions, and the game is adjusted to suit the player's skill level. The device is automatically updated, and new games are continuously developed. The device can be used individually and in groups. (Rostedt 2017.)

The device is used with a touch screen, but no IT skills are required to be able to use it. The target groups include senior citizens and people with a memory disorder whose condition is not yet too advanced for playing. At the beginning of 2017, there were approximately 200 users of the device. Of these, approximately 120 were institutional and 80 private customers. In institutions, one device has multiple users, and some devices are available for use free of charge at memory cafés, memory associations, etc. Throughout the history of the device, it has had over 1,000 test users and active users. A Swedish version for Swedish-speaking Finns was released early in 2017. (Rostedt 2017.)

#### Case 4. HILDA

Hilda is a service developed for the elderly that combines music and memories. Hilda is an easy-to-use touch screen device that comes with a small loudspeaker. The service is particularly suitable as a tool for the personnel of a nursing home or service centre for daily recreational activities. (Vatanen & Johansson 2017.)

Hilda takes the elderly down memory lane to their youth with music, positive historical events and old photographs. The application includes plenty of music from the 1920s to the 1970s. They include both original works and new versions specifically produced for Hilda by frontline Finnish artists. (Vatanen & Johansson 2017.)

Memories brought back by the music and photos can be saved in Hilda via a microphone. The recorded memories are updated in the application in real time, and the users of Hilda can listen to them anywhere in Finland. A recorded memory can be made accessible in all Hilda devices or its accessibility limited to the device on which it was originally recorded. The purpose of Hilda is to provide inspiration through music and memories, particularly for people with a memory disorder. The service aims to promote the well-being and quality of life of the elderly and to support their social and cognitive functional capacity. (Vatanen & Johansson, 2017.)



**Figure 4.** The Hilda service is used on a touch screen tablet (photo: Kardemummo Oy, photographer: Hannu Huhtamo).



**Figure 5.** PPO SmartSole® is a tracking device inside the shoe insole (photo: PPO-Elektroniikka Oy/Kimmo Konttinen)

#### Case 5. SmartSole® tracking device

The SmartSole wearable tracking device was developed in Germany and the U.S. The device was developed for the monitoring of the whereabouts of special groups that need support and monitoring, such as people with a memory disorder. The SmartSole tracking device is located in the shoe insole, which is placed in the shoe of the person with a memory disorder. The solution introduces a new dimension into wearable technology, as it is just an insole of the shoe for the user. The tracking device built inside a shoe sole gives freedom for the user and peace of mind for the family members and professionals taking care of them. With this device, tracking is tactful and discreet. The movements of a person wearing the insole can be monitored on any terminal device, such as a PC, tablet or mobile phone. In Finland, an internet-based map application, the PPO tracking service, has been integrated into the product. SmartSole is battery-operated, and the battery duration depends on the user's activity and the tracking frequency, that is, how long distances the user moves. The average charging interval is one to three days, but it is recommended to charge the device every night to avoid any interruptions of use.

The Smartsole tracking device was awarded in the 'New Products and Technology Awards 2015' contest in the USA as the innovative care solution of the year. In Europe, SmartSole tracking devices are available in Germany, Denmark, Sweden and the UK. In Finland, the distributor is PPO-Elektroniikka Oy. The company first tested the device in 2015. The product has been tested and used by individuals and nursing companies alike. Its characteristics, such as durability and moisture resistance, have been improved on the basis of the test results.

## Conclusion

The idea of doing good is essentially associated with well-being technology and the products described above. The technology must always be based on caring for other people, serving life and humanity, filling in gaps and improving safety as well as fostering fairness, equality and the individual's choices and dignity. The Technology Library is based on the same values, focusing on the promotion of awareness and understanding of technology as an easily accessible, open-for-all service.

The Technology Library has been developed further through projects such as the Boosting Innovation into Business (BIB) project carried out by Laurea. The project applied the methods of co-creation and service design to develop the participants' innovations further. The Technology Library gained a number of new ideas for developing the service and ensuring the viability of the revenue generation model. (Käck 2018.)

'We have gone back to the beginning and considered what our customers need and how we can respond to their needs more efficiently. We received answers to these questions while working on the project and used the answers as the foundation on which we started to improve our activities,' says Kiira Käck, a project officer from the Technology Library. The general public can see the changes as improved accessibility, for example. We have invested in digital communication and increased the frequency of Technology Library open houses and demonstration visits.

In the future, the share of self-acquired technology will increase, and the use of various fitness products and applications will become more popular also among the elderly. From the perspective of acceptability and attractiveness, it is considered important to design technology solutions that are appealing to the eye and easily adaptable for different uses, such as converting a watch and pedometer into a safety bracelet, or turning a necklace and badge into a locator. The Technology Library provides an opportunity to test and compare different products in an encouraging, stressfree environment. Visitors to the Technology Library can take their time to find a suitable solution for themselves or someone close to them, assessing, testing and discussing the solutions with an expert.







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## EFFECTS OF SLEEP HYGIENE EDUCATION ON IMPROVING SLEEP AMONG UNIVERSITY ATHLETES

### Introduction

Physical activity and sleep are essential life habits influencing both physical and mental health. In response to the stressful societal conditions in advanced countries today, numerous studies have examined the benefits and importance of exercise habits and sufficient sleep on mental health and psychological well-being [1-6]. Exercise and sleep are known to be mutually related. Epidemiological studies investigating the effects of sociodemographic, lifestyle, and psychological and physical health on sleep have demonstrated that habitual exercise is an independent factor associated with better sleep [7-9], and that exercise is the most commonly listed habit promoting better sleep [10]. On the other hand, an observational study showed that duration of voluntarily exercise was shorter following nights with shorter total sleep time or longer sleep latency [11]. Causality (underlying mechanisms) in the relationship between exercise and sleep appears complex, including physiological mechanisms, individual characteristics connected to healthy behaviors, and possible external factors such as increased light exposure during exercise.

Exercise is a strenuous stimulus that maintains or inspires wakefulness, and is accompanied by high body temperature, increased sympathetic nervous activity, excitement caused by exercise and a will to perform it. These factors are all thought

to contribute to the generally recognized observation that night exercise proximate to bedtime disturbs nocturnal sleep [12,13]. However, some studies do not support this conclusion [14-16], and other factors, such as bright light exposure and late meals, in combination with late-night exercise, may act to disturb proximate sleep.

Evidence that occurrence of adverse clinical events, such as sudden cardiac death or myocardial infarction, peaks in the morning [17] and that diurnal variation in muscle strength peaks in the late afternoon to evening [18], the ideal time for exercise appears to be in the late afternoon to evening. However, regular exercise at this time tends to be difficult for those occupied with jobs, housework, or studies. In fact, some reports show that a considerable number of people exercise at night [19,20]. Many university athletes whose weekday classes often continue into the evening must commonly train from evening into the night. As university students' lives are under loose social constraints, their lifestyles are characterized by irregular and/or delayed sleep-wake patterns [21,22]. In addition, psychological pressures related to athletic competition and studies may disturb their sleep and mental health. Therefore, such university athletes may represent a counter-case to the concept that habitual exercise promotes better sleep and mental health.

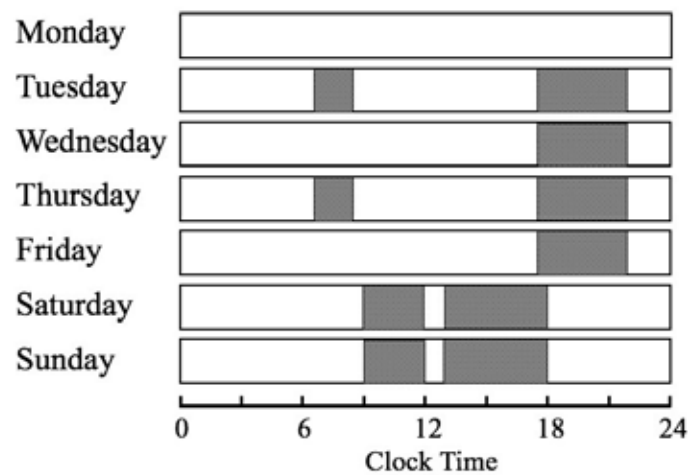
Non-pharmacological treatment, such as sleep hygiene education (SHE), is recognized as a viable, fundamental treatment option for insomnia. Compared with pharmacotherapy, it has the advantages of no side effects and long-lasting efficacy [6,23,24]. As many Japanese adolescents complain about sleep problems such as insufficient sleep, short sleep duration and excessive daytime sleepiness [25], SHE is considered the primary option for improving their sleep.

The purpose of the present study was to examine the effect of sleep hygiene education (SHE) on improving sleep and mental health among competitive university athletes whose daily training takes place at various times of day—evening to night, early morning, and daytime—arranged around regularly scheduled university classes. In conjunction with subjective and objective sleep evaluation, mental well-being was assessed using a general health questionnaire (GHQ) to examine the indirect effects of SHE.

### Methods

The experimental protocol was approved by the Ethics Committee of Tohoku Fukushi University. Twenty-nine Japanese female university students participated in the study after receiving a thorough explanation of the protocol and providing written informed consent. The subjects were athletes belonging to a competitive ball game club with intercollegiate matches held between May and September. Due to some difficulties with data collection, data for 24 out of the 29 participants were adopted for analysis. All participants lived in the same dormitory except for three living nearby in apartments or family homes. The data collection period, including the intervention period, ran from the fourth week of October to the third week of

December. Data collection began one month after the start of the second semester of university classes. The participants' weekly training schedule is shown in Figure 1. That semester, training was scheduled in the early morning (6:30 to 8:30) on Tuesdays and Thursdays, in the evening (17:30 to approximately 21:30) from Tuesday to Friday, and in the morning (9:00 to 12:00) and afternoon (13:00 to 18:00) on Saturdays and Sundays. Light intensity in their indoor training site was between 200 and 500 lx at the eye level of a standing subject. Their training consisted of warming-up, work on specific skills, and team play. Additionally, resistive training was conducted one or two days per week during the experimental period. Participants' heart rates were measured two or three days per week using a Polar RS800 heart rate monitor (Polar Electro Oy, Kempele, Finland), and heart rates during training fluctuated between 100 and 170 beats/min.



**Figure 1.** Weekly athletic club training schedule. Hatched bars indicate time allotted for athletic training. No training was scheduled on Mondays.

A standardized sleep health questionnaire (SHQ) covering participants' previous month of sleep [26] was administered as a subjective sleep evaluation. The SHQ included 14 questions used to calculate a T-score of five sleep health factors consisting of sleep maintenance, parasomnia, respiration, sleep initiation, and morning rising. Participants completed the SHQ after receiving an explanation and giving informed consent. In addition to the SHQ, a 60-item General Health Questionnaire (GHQ) was administered to evaluate mental well-being based on total GHQ score [27]. Thereafter, 11 and 13 participants were selected for the intervention group (IG) and control group (CG), respectively. The IG subjects were all expressed that they were not satisfied with their sleep and hoped to attain improved sleep. At this time, general information regarding sleep hygiene was given to all participants. Table 1 details their average age, height, weight, and BMI before intervention. Although an un-paired t test indicated no significant differences in height, weight, and BMI between the CG and IG, the IG was slightly but significantly younger than the CG ( $p < 0.05$ ).

**Table 1.** Physical characteristics of participants

	Control group (n = 13)	Intervention group (n = 11)
Age (yrs)	20.4 (1.4)	19.3 (0.8) *
Height (cm)	162.5 (6.1)	160.7 (5.0)
Weight (kg)	61.8 (6.1)	57.0 (6.6)
BMI (kg/m <sup>2</sup> )	22.4 (1.7)	22.9 (1.5)

Values are shown as average (SE). \* $p < 0.05$

After administering the SHQ, actigraphic recording was conducted for 1 week during each participant's follicular phase using a MicroMini-Motionlogger (Ambulatory Monitoring Inc., New York, USA). This recording began 1 week after the beginning of their menses. During the recording period, participants were asked to go about their normal daily schedule. They recorded a sleep log, including bedtime, waking time, and meal times. The actigraphs were removed when they trained or showered. The participants were not habitual drinkers, and consumption of all alcoholic beverages was prohibited during the recording period.

At the end of the recording period, IG participants were individually interviewed concerning the results of their actigraphic recordings. During this interview, the participant received instruction on sleep hygiene, including adverse consequences of sleep loss or poor sleep, and key behaviors for improving sleep. Based on the results of each interview, individual logbooks including descriptions of participants' target behaviors were created. IG participants were asked to practice the target behaviors and to record whether or not they accomplished the target behaviors in their logbooks every night. The number of the target behaviors for each participant was between two and four, as shown in Table 2. The target behaviors were categorized into two major groups: a) forbidden behaviors disturbing sleep initiation, and b) behaviors ensuring a reasonable bedtime and sufficient sleep time. While late or irregular rising times are commonly the cause of poor sleep among university students, the participants showed no tendency for late rising.

**Table 2.** Target behaviors set for improving sleep of IG participants

- Do not consume caffeinated beverages after 6 PM.
- Do not consume a heavy dinner if your dinnertime is later than 10:30 PM.
- 30 to 60 min prior to your bedtime, dim the light in your room and relax.
- Do not watch TV in the hour prior to your bedtime.
- Do not use mobile phones in the hour prior to your bedtime.
- If you listen to music at bedtime, use a timer to switch off your music player.
- If possible, take short naps (less than 30 min) between noon and 4 PM.
- Do not nap after 4 PM.
- Try to save time to ensure sufficient nocturnal sleep time.
- Go to bed before 1 AM (or 0030 AM).
- At night, do not fall into asleep at the kotatsu instead of in your bed.

\*Kotatsu: A small table with a footwarmer covered by a quilt.

At the next follicular phase, the SHE effects were measured using data collected from another week-long actigraphy session and post-treatment questionnaires (SHQ and GHQ) completed at the end of actigraphic recording. Data were similarly collected for CG participants without SHE. Menstrual cycle duration—the intervention period—ranged from 22 to 43 days for the IG and 27 to 40 days for the CG, respectively. It was confirmed that no participants experienced menoxenia, sometime observed among endurance athletes.

Actigraphic recordings were analyzed with commercial software (Action-W, 2.4.20, Ambulatory Monitoring Inc., New York, USA) using the Cole-Kripke algorithm for scoring sleeping vs. waking [28]. For each night over the week-long recording period, a sleep period time (SPT), defined as the time period between nocturnal sleep onset and end of the last morning sleep episode, was determined by referring to participants' sleep logs and individual interviews. For each SPT, the total waking time was calculated and recorded as wake after sleep onset (WASO). The percentage of actual sleeping time in each SPT was calculated and recorded as the sleep efficiency index (SEI). Daytime and evening sleep were recorded in three time periods: morning (rising to noon), early afternoon (noon to 4 PM), and late afternoon and evening (4 PM to bedtime). The average value for each of these parameters over the week-long recording was calculated. In addition, the number of nights with SEI <90% was counted for each participant. One weekend in December, during the second recording period, Saturday afternoon and Sunday morning training were cancelled, and an athletic club party was held at which four participants (2 in the IG and 2 in the CG) consumed alcohol. These subjects' actigraphic data from that Saturday afternoon to Sunday morning were thus excluded for analysis.

Statistical analysis was conducted using PASW Statistics 17.0.2 (IBM Corporation). For SHQ results, the raw index scores before T-transform were used for statistical analysis. Since baseline values for sleep parameters differed between the IG and CG, we firstly conducted analysis of covariance (ANCOVA) using the initial value as a covariate. However, ANCOVA was not applicable because the regression lines between the covariate and dependent variables for the IG and CG were nonparallel. Therefore, we simply compared baseline values of SHQ, GHQ, and actigraphic recordings between the IG and CG using Student's unpaired t-tests. Thereafter, a two-way ANOVA (group × time) for repeated measures was conducted to examine variables yielded by SHQ, GHQ, and actigraphic recordings. If significant effects of time or interaction (group × time) were detected, post-hoc analysis within the group was conducted using Fisher's PLSD. Statistical significance was defined as  $P < 0.05$ . All group data were expressed as means ± SE.

## Results

Table 3 shows the results from the SHQ and GHQ before and after intervention. Mean SHQ factor scores for each group were above 50 (standard score of Japanese adults), except for the IG pre-intervention sleep maintenance score which was significantly

**Table 3.** SHQ and GHQ results before and after intervention

	Control group (n = 13)		Intervention group (n = 11)	
	Before	After	Before	After
T-score of SHQ factors				
Sleep maintenance ##, ¶	58.0 (1.3)	61.2 (1.7)	46.2 (2.8)**	54.5 (2.5) ‡
Parasomnia	56.4 (2.0)	61.0 (0.5)	53.2 (2.7)	55.7 (2.2)
Respiration	54.4 (3.7)	57.6 (3.2)	52.9 (2.9)	54.4 (1.9)
Sleep initiation #	66.1 (1.2)	67.1 (1.1)	58.2 (3.1)*	63.1 (2.0)
Rising in the morning	59.7 (1.2)	58.7 (1.8)	54.0 (2.3)*	56.3 (2.6)
GHQ score†	9.1 (2.0)	11.3 (2.5)	16.6 (3.1)*	12.3 (2.7)

Values are shown as average (SE).

T-test between IG and CG before intervention: \* $p < 0.05$ , \*\* $p < 0.001$

Significant main effect of group by repeated measure ANOVA: # $p < 0.05$ , ## $p < 0.005$

Significant main effect of time by repeated measure ANOVA: ¶ $p < 0.005$

Significant interaction of group × time by repeated measure ANOVA: † $p < 0.001$

Fisher PLSD post hoc analysis within group: ‡ $p < 0.01$

lower than that of the CG ( $p < 0.001$ ). Although no significant differences in parasomnia and respiration scores were detected between the groups, pre-intervention IG sleep initiation and morning rising scores were significantly lower than those of the CG ( $p < 0.05$ ). For the three factors on which the IG scored significantly lower than the CG before intervention, a significant main effect of the group was detected by repeated measure ANOVA for sleep maintenance ( $p < 0.005$ ) and sleep initiation ( $p < 0.05$ ). A significant main effect of time by repeated measure ANOVA was found only for sleep maintenance score ( $p < 0.005$ ). This score increased after intervention with a significant increase only in the IG at post hoc analysis ( $p < 0.01$ ).

The pre-intervention GHQ score was significantly higher for the IG compared to the CG ( $p < 0.05$ ), i.e., psychological distress appeared higher in the IG. A significant interaction of group × time by repeated measure ANOVA ( $p < 0.001$ ) was detected with tendencies to show opposite changes; increasing in the CG and decreasing in the IG after intervention.

Weekly averaged values for sleep parameters measured by actigraphic recording before and after intervention are presented in Table 4. SPT showed no significant main or time × group interaction effects, indicating around 400 min (6.7 h) in each group before and after intervention. Before intervention, the IG showed significantly longer WASO ( $p < 0.05$ ) compared to the CG, with tendencies toward decreased SEI ( $p = 0.051$ ) and increased number of nights with SEI <90% ( $p = 0.076$ ). A significant interaction of group × time was found in WASO and SEI ( $p < 0.05$ ) with the IG revealing significant improvements both in WASO and SEI after intervention by post hoc analysis ( $p < 0.05$ ). The CG showed almost no change in WASO, SEI, and number of nights with SEI <90% after intervention. No significant effect of time, group, or interaction was found for sleep time in the morning or afternoon.



**Table 4.** Actigraphy results before and after intervention

	Control group (n = 13)		Intervention group (n = 11)	
	Before	After	Before	After
SPT (min)	395 (6)	386 (8)	406 (14)	398 (14)
WASO (min) †	10.6 (1.5)	13.5 (2.2)	18.9 (3.5)*	11.8 (2.0)‡
SEI (%) †	97.3 (0.5)	96.7 (0.4)	95.3 (3.1)	97.1 (1.6)‡
Number of nights with SEI <90%	0.31 (0.13)	0.54 (0.22)	0.91 (0.31)	0.36 (0.15)
Sleep time				
In the morning (min)	8.1 (2.4)	4.7 (1.8)	8.3 (2.3)	4.8 (3.0)
From noon to 4 PM (min)	16.6 (3.1)	17.0 (5.0)	18.6 (5.3)	19.2 (6.6)
From 4 PM to bedtime (min)	4.8 (2.2)	4.6 (1.5)	6.7 (2.2)	4.9 (2.1)

Values are shown as average (SE).

T-test between IG and CG before intervention: \*p < 0.05

Significant interaction of group x time by repeated measure ANOVA: †p < 0.05

Fisher PLSD post hoc analysis within group: ‡p < 0.05

## Discussion

Participants characteristically trained for long periods of time and at various times of day throughout the week: evening to night on two days, early morning and evening to night on 2 days, and daytime on 2 days. As the subjects were members of a competitive ball club, they underwent various types of practice and training for team play, individual skills, and fitness, resulting in long training times. Although it is generally accepted that the best time for physical exercise—in terms of optimal performance, safety, and good sleep—is late afternoon to evening, university classes were held from morning to evening on weekdays, thus necessitating training at night and in the early morning. Night exercise proximate to bed time is generally considered to disturb the following sleep [12,13], although some studies on athletes do not support this [14-16]. The participants in this study, in addition to day and night exercise, scheduled early morning exercise twice a week, forcing them rise early in the morning. Although studies examining similar populations exercising at various times of day were not available, similar cases are relatively common for students or businessmen/women who have classes or duties during the daytime, or for elite athletes who often travel to participate in competitions held at various times of day.

Although three of five pre-intervention SHQ factor scores were significantly lower for the IG than the CG, the absolute values of those factor scores suggested that both groups could be identified as good or normal sleepers. Further, pre-intervention SEI values of 97.3% and 95.3% in the CG and IG, respectively, were very high. Although it was expected that university athletes might experience sleep-disturbing factors such as irregular and/or uncommon training schedule, psychological pressures related to athletic competition and studies, and/or excessive fatigue, the sleep-promoting effects of daily exercise seemed to prevail over these sleep-disturbing factors. This

is in line with previous reports associating habitual exercise with better sleep [7-9]. The other possible reason for high sleep quality is relatively short sleep time, which was shown to be around 400 min by actigraphically measured SPT. A study comparing sleep time among university students internationally has shown that sleep time among Japanese university students is the shortest in the world [29]. In that study, reported sleep time of Japanese female university students averaged 6.09 hours (95% confidence interval: 5.92-6.26 h). The present study's participants' sleep time (shown in Table 4) was somewhat longer than that. Examining the effect of habitual exercise type on nocturnal sleep, one study reported that polysomnographic recordings on sedentary days showed that long distance runners had significantly longer total sleep times than sedentary subjects, but that athletes involved with power training or ball games did not [30]. However, meta-analytic studies [31,32] have demonstrated that both acute and chronic exercise promotes longer total nocturnal sleep time. In the present study, daytime sleep, as indicated by actigraphy, was generally recorded in sleep logs as occurring during university classes. This suggests that the athletes in the present study might require longer sleep times, and their high propensity for sleep might increase the factor score of sleep maintenance and reduce nocturnal WASO.

While there was relatively a little room for sleep improvement in the IG, SHE induced small but significant improvements in both subjective evaluation of sleep maintenance scores and objective values of WASO and SEI as recorded by actigraphy. Those sleep improvements were recognized as an outcome of the participants' self-controlled behavior and environmental arrangement related to sleep hygiene issues, which included avoiding behaviors that disturb sleep or proper human circadian rhythms, and making adequate time for sleep. Conversely, IG participants had paid little attention to such sleep hygiene issues before intervention. Moreover, some participants had acted upon mistaken ideas, such as trying to take daytime naps whenever possible for physical and mental restoration. As university students are generally under loose social constraints [21,22], irregular and/or exceptional training schedules can cause adverse life habits inducing poor sleep. It is necessary to educate university athletes about sleep hygiene and the adverse consequences of short or poor sleep which have negative impacts on sport performance and student life.

Interestingly, the IG was significantly younger than the CG, implying that the senior CG athletes had in some way adapted to university life, including studies and club activities. Or, from the other point of view, younger university athletes may have not yet adapted to university life, resulting in poor sleep habits and the higher psychological distress suggested by higher GHQ scores. Therefore, sleep hygiene education considering athletic club activities should be provided at the beginning of university life.

Before intervention, psychological distress as evaluated by GHQ was significantly higher in the IG than in the CG. The relationship between poor sleep status and adverse psychological and psychiatric symptoms is well-demonstrated in



epidemiologic [33,34] and prospective studies [35-37]. These findings concur with the present results, indicating that GHQ score as a parameter of psychological distress was significantly more severe in the IG than the CG before intervention. After intervention, GHQ score in the IG tended to decrease to the level of the CG with a significant group  $\times$  time interaction. This result implies that psychological distress might be relieved by sleep improvement. Comparable findings have been reported in the elderly; psychosocial intervention improved sleep with significant improvement in GHQ results [38] and performance of neuropsychological tasks [39]. Whereas psychological distress might be influenced by various factors related to lifestyle, workload, and human relations, sleep improvement is likely to be a beneficial intervention for improvement of psychological state or brain function. Conversely, chronic poor sleep in athletes may aggravate physical and psychological states, possibly leading to burnout or overtraining syndrome [40,41].

## Conclusions

In conclusion, the present study demonstrated that university athletes showed good or normal quality of sleep despite sleep-disturbing factors such as an irregular/exceptional training schedule and psychological pressures related to athletic competition and studies. SHE, including individual interviews referring to subjective and objective sleep assessments induced small but significant sleep improvements accompanied by lessening of psychological distress. Considering the loose social constraints on university students' lives, SHE seems effective and necessary for athletes who may struggle in adjust to university life with an irregular training schedule.

## Acknowledgements

This work was carried out in the Kansei Fukushi Research Center of Tohoku Fukushi University, Sendai, Japan, and was supported by the "Academic Frontiers" Project for Private Universities, and a matching fund subsidy from the Ministry of Education, Culture, Sports, Science and Technology, Japan (2004-2008).

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PART 2  
PREVENTIVE  
INNOVATIVE  
METHODS

Michiaki Shibata

## THE CURRENT STATUS OF CHILDCARE IN TSUNAMI-AFFECTED AREAS OF MIYAGI AND THE POSSIBILITY OF USING VR TECHNOLOGY IN CAREGIVER TRAINING

### Childcare in Japan

In Japan, day care centers and kindergartens provide day time care for preschoolers. Day care centers are welfare facilities aimed at caring for and nurturing preschoolers who need childcare because their parents are working (or other reasons). Kindergartens are educational facilities aimed at caring for and educating preschoolers. While day care centers, as welfare facilities, are not specifically tasked with educating children, educational activities such as reading and writing are actually carried out. The greatest difference between day care centers and kindergartens is the age of the children. Day care centers accept children from zero to five years of age, but children generally must be three to five years old to enter kindergartens. Another difference is time at the facility. Kindergartens typically keep children for around five hours daily, while children may stay at day care centers from eight hours (short-term care) to eleven hours (long-term care). The eleven hour figure is based on the fact that parents with full-time employment typically work an eight-hour day with one hour for lunch, making for nine hours at the workplace. Including a commute that may take two hours, eleven hours of care may be needed. Given a family with two working parents, if the parent working shorter hours works

less than about 120 hours per month, the household is approved for short-term care; while if the parent working shorter hours works over 120 hours per month, they qualify for long-term care. Day care centers and kindergartens can also extend their hours, and some day care centers can keep preschoolers until 10 p.m. If both parents work, it is clearly easier to use day care centers than kindergartens.

When parents apply to enroll their child at a day care center, both submit work certificates. The day care center assesses each household using a scoring system based on the situation and composition of the family. For example: Do both parents work? Is it a single parent household? Do grandparents live nearby? Is a currently unemployed parent now seeking employment? Admission is then granted to the highest-scoring applicants. The monthly childcare fee depends on the total annual income of the parents, their employment situation, the age of the child, the number of siblings, and the municipality. For example, at a public day care center in Shinjuku-ku, Tokyo, a household with an annual income of about 8 million yen would pay approximately ¥43,000 per a month for their first, infant child (under a year-old). Meanwhile in Aoba-ku, Sendai city, Miyagi prefecture where the author lives, the same arrangement would cost approximately ¥59,000 per a month.

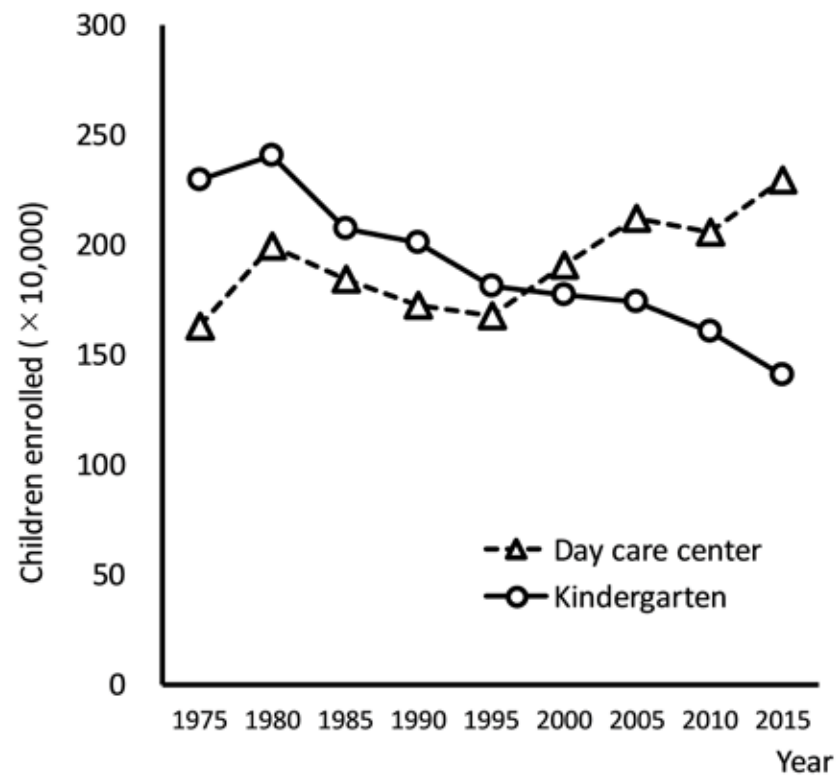
Minimum national standards stipulate that day care centers employ one caregiver per infant under 1 year and one caregiver for every 30 children at five years of age. Labor costs thus dictate that fees are highest for the youngest children and drop as they age.

The situation is quite different for kindergartens. Admission policies and procedures vary widely from one kindergarten to another. In addition to application forms, some kindergartens administer interviews and exams. Admission decisions are not based on family situation or composition. Fees also vary widely and are not affected by household income, except for some public kindergartens. At a public kindergarten in Shinjuku-ku, Tokyo, a household with an annual income over 6 million yen, would pay approximately ¥6,000 per a month for an only child of three years old. Costs would be the same at a public kindergarten in Aoba-ku, Sendai, regardless of income. Most kindergartens are actually private, with monthly fees in the 20 to 30 thousand yen range. Parents pay about the same for a three year-old at a public day care center, but can leave their child for a much longer period each day. Again, the difference between the two is that day care centers provide childcare for working parents with full-time jobs, while kindergartens are educationally-oriented businesses that anyone can use.

Although Japan's birthrate is declining and there are fewer children of pre-school age each year, 55,000 children are currently on waiting lists to enter authorized day care centers. Why? Behind this problem are changes in attitudes toward employment of men and women over the past 20 years and the high caregiver turnover rate at day care centers. Figure 1 shows that the relative numbers of children in kindergartens vs. daycare centers reversed between 1995 and 2000. In the same period, the proportion of male-only employed households vs. dual-income households



also flipped, as shown in Figure 2. The increased demand for admission to day care centers, thus seems strongly tied to changes in employment patterns. In pre-1990s Japan, men typically worked outside the home while women handled housekeeping and childcare at home. From the 1990s through the 2000s, however, more and more women began to work outside the home. The government is preparing for future labor shortages due to the declining birthrate and is expecting the greater utilization of women of child-rearing age in the labor force. Therefore, even if the birthrate continues to decline, the number of children entering day care centers will increase for some time.



**Figure 1.** Data showing the trend from kindergarten to day care center enrollment. Day care center data are from the Survey of Social Welfare Facilities, 1975-2015. Data on kindergartens and centers for early childhood education and care are from the Annual Report on School Basic Survey, 1975-2015.



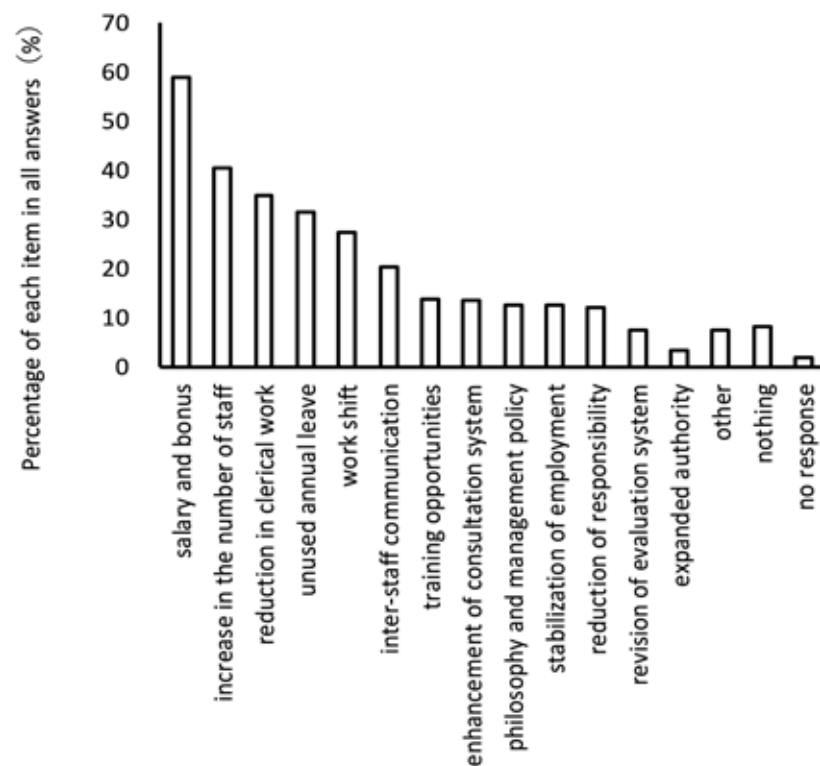
**Figure 2.** Data showing the trend from single- to dual-income households, based on the White Paper on Gender Equality (2017).

With the increase in dual-income households, the need for day care centers has increased. Meanwhile the annual turnover rate among child caregivers (hereafter simply called “caregivers”) is as high as 10.3%, and 49.2% of those quitting their jobs had worked at the facility for fewer than eight years. (Survey of Social Welfare Facilities, 2015). Figure 3 shows the results of a survey on needed workplace improvements given to caregivers in Tokyo (Report of Child Caregiver Survey in Tokyo, 2016). Results show that caregivers want improvement in areas such as salary and bonuses (59%), increasing staff (40.4%), reduction in clerical work (34.9%), using annual leave (31.5%), work shift scheduling (27.4%), inter-staff communication (20.3%), and training opportunities (13.7%). In fact, it is reported that caregivers’ average annual income is approximately 60% of the average annual income for all industries in Tokyo—a deficit of around 2 million yen (Survey of Basic Statistical Survey on Wage Structure, 2014).

Concerns about inter-staff communication and training opportunities indicate that staff do desire to be part of a better-functioning, more knowledgeable workforce. The author conducts educational psychology training and supervision at day care

centers. Most requests from caregivers involve communication problems among staff, between caregivers and parents, and between caregivers and preschoolers. Caregivers additionally express anxiety about their own childcare practice and the behavioral problem presented by the preschoolers. Under such challenging circumstances, it is difficult to prevent early job-leaving of caregivers and difficult to reduce the number of children on waiting lists. In an effort to decrease the number of children on day care center waiting lists, an increasing number of centers for early childhood education and care (Nintei kodomo-en) are being approved. Nintei kodomo-en combine the positive aspects of both kindergartens and day care centers, and children can be enrolled regardless of whether their parents work or not. In fact, kindergartens experiencing decreasing enrollment are being encouraged to transition to Nintei kodomo-en.

In regards to staff retention, although measures have been taken to raise the pay of caregivers who complete training courses, the working environment—in terms of the amount of clerical work and staff numbers—has not improved.



**Figure 3.** Day care center workplaces: Areas selected by caregivers as needing improvement (multiple answers allowed), based on the Report of Child Caregiver Survey (Tokyo Metropolitan Government, 2016).

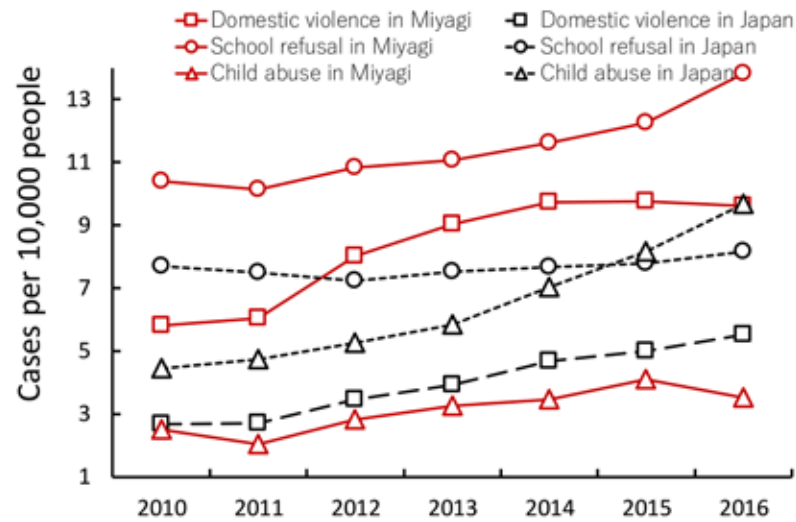
## Increasing restlessness among preschoolers in areas affected by the Great East Japan earthquake

Under the circumstances above, the role of the university in local day care centers is to improve the quality of childcare staff by providing supervision and training opportunities. This includes offering advice and guidance on how to deal with children at the facility and any difficulties that arise. What kinds of preschooler behavior can confuse and trouble their caregivers? In this section, the author considers problem behaviors of children as reported by caregivers in Miyagi prefecture over the last five years.

At 2:46 pm on March 11, 2011, the Great East Japan Earthquake struck off the Pacific coast of Tohoku and caused immense damage in Miyagi and neighboring prefectures. With a magnitude of 9.0, it was the world's 3rd-largest earthquake since the start of the 20th century, and approximately 20 thousand people were killed in the following tsunami. Today, 2,536 people remain missing, more than the number of casualties from Hurricane Katrina, in 2005. In 2011, researchers investigating the mental health of residents in the affected area—using questionnaires such as K6 (Kessler psychological distress scale) and IES - R (impact of events scale-revised)—showed that many participants were in problematic mental states or were at high risk of post-traumatic stress disorder (Table 1). Statistics from Miyagi prefecture in the 2010 to 2016 period show that the numbers of domestic violence and school refusal cases were consistently higher than the national averages (Figure 4). Domestic violence cases, in particular, rose in the two to three years after the earthquake, while school refusal cases rose over the four to five years after the earthquake. Miyagi now has the nation's highest rate of school refusal. The Miyagi Prefectural Board of Education believes these trends are due to the negative effects of the earthquake on family environments, although it may be difficult to prove this causal relationship statistically. Meanwhile in tsunami-hit areas, caregivers insisted that the number of preschoolers displaying impulsivity and/or hyperactivity (with symptoms resembling attention deficit and hyperactivity disorder (ADHD)) increased greatly from 2014 to 2015.

Citation	Sample type (location)	N	Findings (subject proportions, measurements)
Koyama et al. (2014)	Residents	281	35.9%, K6 $\geq$ 13
Mommma et al. (2014)	Small and medium enterprise employees	522	14.3% (men), IES-R $\geq$ 25 (5 months post-disaster)
			24.4% (women), IES-R $\geq$ 25 (5 months post-disaster)
Takeda et al. (2013)	Female high school students	1180	10%, IES-R $\geq$ 25
Matsubara et al. (2014)	Survivors remained at damaged residences	5454	8.1%, depressive reaction (Patient Health Questionnaire)
Nishigori et al. (2014)	Postpartum women	677	20%, Edinburgh Postnatal Depression Scale $\geq$ 9

**Table 1.** Results of 2011 mental health survey for residents in areas affected by the Great East Japan Earthquake.



**Figure 4.** The number of cases of domestic violence, school refusal, and child abuse in Japan and Miyagi prefecture. Data on domestic violence based on the Annual Report on the Present Situation and Measures of Gender Equality (Miyagi prefecture, 2017) and the Annual Report on Cases of Stalking and Spousal Domestic Violence (National police agency, 2017). School refusal numbers based on School Basic Survey. Child abuse numbers based on the Changes in the Number of Consultation Cases by Child Abuse Type (Miyagi prefecture, 2017) and, Child Abuse Consultation at Child Guidance Center (Ministry of health, labor and welfare, 2016).

For example, at one facility, it seems that about half of the 30 children in one class displayed such behavior, and this has taken a toll on the staff. It was initially thought that the number of ADHD cases was increasing rapidly, but the normal prevalence of ADHD is at most three to seven percent. In a class of 30 preschoolers, one or two, at most, might be diagnosed with ADHD, and a dramatically higher incidence in a coastal area of Miyagi would not be expected. When the author and colleagues visited day care centers in the affected area, we, indeed, observed numerous preschoolers having tantrums and kicking or hitting others or objects. However, we also saw preschoolers glancing at teachers before and after a tantrum, becoming overly close with strangers, or wanting to monopolize caregivers' attention. When unknown adults visit day care centers, preschoolers often become more subdued and respectful than usual. However, preschoolers displaying behavior problems often approached us closely on first meeting. Children with ADHD generally make less eye contact, jump up suddenly, are violent with other children, or tend to be consistently hyperactive, regardless of cognitive and emotional state. Although some of these behavioral characteristics were observed in these children, children with ADHD seldom approach unknown adults, and rarely try to monopolize care givers' attention. Therefore, episodes of hyperactivity and impulsivity among preschoolers in the coastal area of Tohoku are unlikely to result from ADHD.

In addition to ADHD, there are disorders with episodes of hyperactive/impulsive behavior including reactive attachment disorder (RAD), disinhibited social

engagement disorder (DSED), and developmental trauma disorder (DTD: Van der Kolk, 2005). An attachment is defined as a special emotional bond that an infant has for a particular adult, such as a parent (Bowlby, 1969). Once an attachment has formed between them, the infant will use the adult as a secure base for exploration of the surrounding environment, returning to that base in a crisis. For instance, an anxious infant will cling to the adult(s) to whom s/he feels an attachment in order to gain (or preserve) a sense of security. In the absence of such a crisis, an infant will venture out to explore and occasionally return to the adult. Originally, Bowlby thought attachment was a special, emotional bond that occurs between mother and child. However, Rutter et al. (1979) revealed that developmental problems regarding attachment attributed to the absence of a mother are not caused by the mother's absence, but by a poor care facility environment or receiving care from unspecified caregivers. That is, an attachment can be also formed between an infant and a small, fixed number of caregivers.

According to the Diagnostic and Statistical Manual of Mental Disorders 5 (DSM 5)—a diagnostic reference manual issued by the American Psychiatric Association—RAD and DSED may develop when a child experiences repeated changes of primary caregiver, social neglect or deprivation, rearing in unusual settings, and so on. In such a situation, if the child displays minimal social/emotional response to others, episodes of unexplained irritability, sadness, or fearfulness—even during nonthreatening interactions with caregivers—they can be diagnosed with RAD. Likewise, if the child exhibits overly familiar verbal or physical behavior with unfamiliar adults, fails to check with an adult caregiver after venturing away in unfamiliar settings, shows a willingness to go off with unfamiliar adults with little or no hesitation, or displays socially disinhibited behavior (not limited to impulsivity) like ADHD, they can be diagnosed with DSED. Children with DSED often approach adults inappropriately, but they have difficulty interacting with others, especially other children. Thus, children with DSED sometimes behave in a hyperactive and impulsive manner, other times not. Both RAD and DSED are caused by instability and inappropriate rearing and are greatly improved in most cases when children are placed in a stable rearing environment (Nelson, Fox & Zeanah, 2014). Although the morbidity rate for these disorders is not clear—even among infants who experienced severe neglect—these disorders develop in only 10-20% of cases.

Recently, van der Kolk proposed a new diagnostic classification—DTD. DTD can develop in response to multiple exposures to interpersonal trauma including abandonment, betrayal, physical or sexual assault, or witnessing domestic violence. Children with the DTD exhibit a typical pattern of successive disorders: emotional and behavioral regulatory disorder during infancy, attachment disorders with or without disinhibition at preschool age, hyperactivity disorder at school age, or combined social behavior and affective disorders during adolescence. In young adulthood, personality disorders are common and often accompanied by substance abuse, self-harm, and affective disorders (Schmid, Petermann, & Fegert, 2013). Thus, DTD sufferers exhibit age-related psychological symptoms at different developmental stages. Especially noteworthy is that children with DTD also exhibit hyperactivity

and impulsivity from preschool to adolescence. DTD is a relatively new concept and is not included in DSM 5, so the morbidity rate is also uncertain.

The prevalence of DTD is uncertain, and only 10 to 20% of infants who experience severe neglect develop RAD or DSED. Even if the occurrence rates of these three disorders are added, it is difficult to explain the “half of my class of preschoolers are restless” comments from the tsunami-affected area. According to Yonezawa (2015), even if not diagnosed with RAD or DSED, as many as 30% of these children may be having attachment issues. In addition, Levy & Orlands (2000) claimed that children with attachment problems present undesirable behaviors such as rebellious, challenging, impulsive, lying, aggressive, hyperactive behaviors, and so on. If many of the preschoolers in the tsunami affected area have problems with attachment, and there is a mix of diagnosed and undiagnosed cases, it is possible to see how half of a class of preschoolers could be abnormally restless. Since children who were younger than three years-old in 2014 did not directly experience the Great East Japan Earthquake (GEJE), their attachment issues cannot be directly attributed to that event; suggesting that the childcare environment may be worsening in GEJE-affected areas.

### Possibility of using VR technology in child caregiver training

Given the behavior problems of preschoolers in GEJE-affected areas, the author here discusses appropriate approaches to the children and the effectiveness of VR technology in caregiver training. When a child lies or hits another child or a caregiver, the caregiver tends to focus on the problem behavior and scold the child: “Don’t tell a lie!” or “Don’t hit others!” Although it is important to scold when a child behaves badly, if left at that, the emotional experience—happiness, anger, sadness, or anxiety—of both assailant and victim—remain unprocessed. This tendency is quite salient in preschoolers having problems in attachment formation with adults, including parents and caregivers. Emotional literacy—the ability to understand and empathize with one’s own and others’ feelings—has been a focus of much recent discussion, and it is thought that accepting and aiding children in understanding and verbalizing their own emotions can be very effective in reducing problem behavior. In this way, cultivating emotional literacy in children can also help them form appropriate attachments with caregivers or their parents.

Words and behaviors coming out of a child’s positive (happy, pleasant) emotional experiences are easy for caregivers to accept. However, expression of hurtful language and violent behaviors based on negative emotional experiences (anger, anxiety) often make caregivers themselves feel anxious and hurt. Before caregivers are directly exposed to such problem behavior, it can be helpful to learn effective coping strategies through experience in a safe, highly realistic environment. Teaching methods using virtual reality (VR) technology have recently received

increased attention as a way to provide training for situations that are difficult to replicate in a classroom or other venue. For example, directly observing the state of a volcanic crater involves exposure to dangers such as toxic gases, high temperatures and lava spouts. However, a remote controlled aircraft equipped with a 360 degree camera can deliver image data allowing 360 degree, omnidirectional viewing around the crater. Using VR goggles, you can experience the crater in 3D as if you were actually there. Research on the use of VR in anatomy instruction with medical university students has compared manipulating a virtual model of the anatomical structure of the inner ear with simply viewing these structures. Results showed that participants in the virtual manipulation group were significantly more likely to successfully draw the observed structures in a post-test than the viewing group (Jang, Vitale, Jyung, & Black 2017). As preparing cadavers and animal models for anatomical instruction is very costly and impermanent, using virtual reality technology to provide low-cost, realistic, unlimited experience with even difficult-to-prepare anatomical structures holds great promise.

As the old saying, “One picture is worth a thousand words,” would suggest, it seems easier to learn in authentic or VR environments than through voice or text. If we can virtually experience problem behaviors such as a child’s violence or abusive words, we can better understand and verbalize the emotions experienced by both child and caregiver in such situations. In addition, VR teaching materials can help caregivers predict and prepare for such scenes, thus protecting them from the trauma of unexpected experience during actual childcare. In the near future, child and caregiver interactions in day care centers will be digitally recorded and shared on the cloud to provide learning opportunities. Visualizing and sharing information on successful and failed interactions in cases of problematic behavior should help caregivers considerably in their training and development toward providing high quality care.

What kind of childcare environment is necessary for forming appropriate attachment between child and adult? The author believes that a stable environment in which positive and negative emotional experiences can be expressed by children in safety is the best guarantee. It is hoped that caregivers will increasingly have the opportunity to learn the importance of attachment formation and emotional literacy at an early stage in their in childcare careers through VR teaching materials.

### Acknowledgments

I sincerely thank Dr. Mikio Hirano and Dr. Tomoaki Adachi for their collaboration on this work. I am grateful to Professor Schmidt Kenneth for carefully proofreading the manuscript. This research was supported by Grants from several organizations, including the Lions club dist. 332-c, the Mazda Foundation, and the Japan Society of Developmental Psychology.



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Anne Hiller-Ikonen & Anne Pirinen

## SUPPORTING INTERACTION BETWEEN A DEPRESSED MOTHER AND AN UNBORN BABY

The article discusses the mother's prenatal depression from the perspective of early interaction between the unborn baby and the mother. The article focuses on the following questions: 'What negative effects does depression in pregnancy have on the attachment relationship between the unborn child and the mother?' and 'What preventive psychosocial support do Finnish maternity clinics provide for depressed mothers and their spouses to support the attachment relationship and early interaction between the parent and the baby?'

Depression in early stages of motherhood increases the risk of mental and developmental problems in children. Pre- or postnatal depression in mothers is rather common. The emotional relationship, or bond, between the mother and her baby develops already during pregnancy, affecting the postnatal attachment relationship between them. The mother's adequate capacity for mentalising is considered important for the development of the bond between the mother and baby. Mentalising refers to the ability to reflect on conscious and subconscious emotions and thoughts in oneself and others. Prenatal depression may have a negative effect on the mother's mentalising ability. Consequently, the mother is unable to mentally prepare for the arrival of the baby. After the birth of the baby, the mother's inadequate mentalising ability reduces the mother's ability to respond to the baby's emotional messages. This, in turn, has a negative effect on the development of the baby's emotional

regulation and self-regulation. Supporting interaction between the family members and reducing the stressful factors affecting them are preventive and effective treatment from the child's perspective. Methods that may be used to support the interaction may include preventive psychosocial interventions (such as identification of prenatal depression using the EPDS form), discussions to strengthen the parent's resources and mentalising as well as interaction between the parent and baby, group support and support provided through the family welfare work carried out by the child health clinic.

### Introduction

The existence of maternity and child health clinics is seen as one of the factors that has most improved the health of Finnish people over the course of the past 70 years (Huttunen, 2011). The first maternity and child health clinics were founded in 1920. The Act on Municipal Prenatal and Child Care Clinics 224/1944 was passed in 1944. The law obligated municipalities to arrange maternity and child health clinic services as part of basic health care. In 1940, the infant mortality rate in Finland was 88.3 per mille. By 1950, this rate had fallen to 43.5 per mille. In 2017, the infant mortality rate in Finland was 2 per mille (Infant mortality rate, Findikaattori, 2018).

The aim of the maternity and child health clinics is to promote the physical and mental well-being of the whole family (Hakulinen-Viitanen et al. 2012.) A mother's prenatal depression puts a strain on the health and well-being of the whole family. Of all mothers, 15–20% suffer from depression during pregnancy. (Riihimäki & Vuorilehto 2014.) According to a recent study from 2018 concerning the health and well-being of children and child services, most parents feel that visits to the maternity clinic are customer-oriented and they are very satisfied with maternity clinic services. Parents feel that they need additional support concerning getting ready for the birth, fear of childbirth and their relationship. Parents feel that they receive adequate support concerning general well-being during pregnancy, parenthood and emotions (Klemetti et al. 2018). This review article focuses on the following questions: 'What negative effects does depression in pregnancy have on the attachment relationship between the unborn child and the mother?' and 'What preventive psychosocial support do Finnish maternity clinics provide for depressed mothers and their spouses to support the attachment relationship and early interaction between parent and baby?' Information searches for the articles were made in the databases shown in Table 1 for the period from 2008 to 2018. In addition, articles were searched for manually in Laurea Finna, in the library of the University of Tampere, through the Google Scholar web search service and through the website of the Finnish National Institute of Health and Welfare (see Table 1).

DATABASES INFORMATION SEARCHES FROM 2008 TO 2018	TOTAL NUMBER OF ARTICLES RETRIEVED THROUGH THE SEARCH = 261
	NUMBER OF ARTICLES CHOSEN = 26
EBSCO	3
MEDIC	10
TERVEYSPORTTI (DUODECIM)	1
JULKARI (THE FINNISH MINISTRY OF SOCIAL AFFAIRS AND HEALTH)	1
MANUAL SEARCH	11

**Table 1.** The databases and number of articles

## The connection between the mother's prenatal depression and the development of an attachment relationship between the mother and the unborn baby

The development of an attachment relationship between a parent and baby begins already during pregnancy, with the mother creating a bond with the unborn baby (Rubertsson et al. 2015). Prenatal attachment refers to the parent's emotional commitment which shows in the parent's behaviour and the impressions associated with the baby (Lindroos, Ekholm & Pajulo 2015). Creating an attachment relationship is important for adapting to the pregnancy. It is predictive of the interaction with the baby as well as the mental images of the baby and the family being formed. Therefore, it is important to be familiar with factors that affect or may impair the mother's healthy development during pregnancy. (Rubertsson et al. 2015). The development of a strong attachment during pregnancy has been shown to be associated with a good postnatal interaction between the mother and baby as well as a safe attachment relationship and positive development. Therefore, it is important for those providing maternity services to identify the factors that can disturb the development of an attachment relationship and to support its early development. (Lindroos, Ekholm & Pajulo 2015)

Various risk factors of the expectant mother, such as substance abuse, depression, age (very young or old), low social support, the mother's negative childhood experiences of human relations and fear of giving birth, can impair the normal development of prenatal attachment. Signs of a low attachment during pregnancy include, for instance, denial of pregnancy, faint or negative emotional expression and attitude when talking about the pregnancy or the foetus, reluctance or inability to think of the child as a person of its own, and reluctance to prepare the home for the arrival of the baby. Therefore, it is important for those providing maternity services to identify the factors that can disturb the development of an attachment relationship and to support its early development. (Lindroos, Ekholm & Pajulo 2015.)

## Risk factors of prenatal depression

The main risk factors contributing to a low-level attachment relationship during pregnancy were depression, negative feelings about parenthood and the birth of the baby as well as lack of support from the partner and family. (Rubertsson et al. 2015). Many changes take place during pregnancy, and the expectant mother needs physical, social and mental resources to adapt to these changes. Mood swings and mental instability are often experienced in pregnancy. Negative and conflicting emotions are also part of a normal pregnancy. The mother's mental well-being during pregnancy affects the developing baby. Particular attention should be paid to the early identification of symptoms and disorders, taking into account the many special features of pregnancy. (Mäkelä, Pajulo & Sourander 2010.)

The symptoms of depression include a depressed mood, loss of interest and feelings of pleasure, fatigue and pronounced feelings of guilt and helplessness. The rate of prenatal depression determined in different studies varies from seven to twenty per cent. According to some studies, it is even more common than postnatal depression symptoms. For mothers with a history of depression episodes, the risk of a recurrence increases during pregnancy. (Mäkelä, Pajulo & Sourander 2010.)

Untreated depression in a pregnant woman increases the risks related to the progress of pregnancy as well as the development and well-being of the baby before and after birth. Depression in a pregnant woman often remains unidentified, and it has received less attention compared with postnatal depression. For women with a previous depression episode, the risk of a recurrence is doubled in pregnancy. The other risk factors for developing depression during pregnancy include an unwanted pregnancy, being a single parent, domestic violence and a low level of social support. Factors predisposing to depression also include financial problems, stressful events in life and a tendency for anxiety. All of these phenomena can be identified at the maternity clinic. (Riihimäki & Vuorilehto 2014; Lindroos, Ekholm & Pajulo 2015; Waters et al. 2014.)

Depression increases the mother's cortisol production, which in turn increases the cortisol level in the foetus. Depression may affect the mother's behaviour in a manner that is harmful to the unborn baby: sleeping poorly, neglecting meals and, possibly, being indifferent about the well-being of herself and the unborn baby. In addition, compared with other mothers, breast feeding is less common among mothers who have suffered from prenatal depression. (Riihimäki & Vuorilehto 2014.)

Depression symptoms have been found to be particularly harmful to the interaction relationship between the mother and the baby if symptoms are present both pre- and postnatally. Compared with other mothers, depressed mothers have been found to have a more negative attitude towards their pregnancy and a weaker emotional attachment to the unborn baby. Depression is also associated with living habits that are harmful with respect to the pregnancy and the unborn baby,

such as substance abuse and a low weight increase during pregnancy. It seems that emotional attachment to the unborn baby also protects the mother from depression symptoms: the stronger the attachment, the less frequently the mother presents with depression symptoms in late pregnancy and postnatally. (Lindroos, Ekholm & Pajulo 2015.)

### Preventive support for an attachment relationship between the mother and the unborn baby

Possible risk factors affecting the mother's emotional attachment and future early interaction can be identified at the maternity clinic. (Lindroos, Ekholm & Pajulo 2015.) Any interventions should be preventively targeted at the entire family (Korhonen & Luoma 2017).

The health examination programme of Finnish maternity clinics includes an extensive health examination scheduled for weeks 13–18 of pregnancy. One of its objectives is to evaluate the mood of the pregnant woman and her spouse and to identify their mental problems, such as the mother's prenatal depression. The extensive health examination includes appointments with a public health nurse and a doctor. Both spouses are invited to these appointments. The objective is to survey the family's overall well-being through observation, discussion and interviews. If the public health nurse or doctor does not have enough experience or competence to assess the parents' mental well-being, psychiatric specialist services can be consulted. (Hakulinen-Viitanen 2012 et al.; Klemetti et al. 2013.)

### Indicators of prenatal depression or risk of prenatal depression used in the extensive health examination

It is recommended that the extensive health examination carried out by the maternity clinic include screening the mother's depression symptoms in weeks 13–18 of pregnancy with the EDPS (Edinburgh Postnatal Depression Scale) survey, validated in several countries and developed by J.L. Cox and his team in 1987. The questionnaire is suitable for assessing the mental well-being of the mother and her spouse on appointments and home visits, supplementing the assessment of their overall well-being. The questionnaire can be used for the assessment of pre- and postnatal depression alike. (Freed, Roger & Tompson 2012; Klemetti et al. 2013.) The screening of prenatal depression should focus on families expecting their first child (Lindroos, Ekholm & Pajulo 2015).

The EPDS questionnaire is a set of 10 questions that are related to experiencing pleasure; sadness; self-accusations; experiencing anxiety and fear; feeling of inefficiency; sleeping problems; and thoughts associated with self-harm. Each statement in the questionnaire has four alternative responses, measuring either the quantity or frequency of the experiences. The total score (0–30) indicates the severity of the

depression symptoms. If the total score is 13 or higher, the pregnant mother or her spouse is referred to a doctor. If the total score is 10–12, it is recommended to carry out a new assessment after 2–4 weeks. If the depression symptoms are mild (score 10–11), the maternity clinic provides preventive psychosocial support for the pregnant mother and her family and also home help if needed. If the mother or her spouse has self-destructive thoughts (statement number 10 in the EPDS form), immediate help must be provided for them, even if the total score does not indicate depression symptoms. (Hakulinen & Solantaus 2017.)

Korhonen & Luoma (2017) state that supporting interaction between the family members and reducing the factors burdening the family constitute a preventive and effective treatment from the baby's perspective. The resource questionnaire ('A questionnaire for identifying the factors that strengthen and burden parents expecting their first child') can be used by the maternity clinic for the extensive health examination to survey the mother's life experiences before the pregnancy, her situation in life, her concerns during the pregnancy and her expectations on life after the birth of the baby. The parents can answer the resource questionnaire together or individually at home or during an appointment. The questionnaire includes questions concerning the health and living habits of the pregnant parent, the parent's own childhood experiences, relationship with the partner, growth into parenthood, social support and financial situation. The objective is that answering the questionnaire triggers a discussion between the parents and that the parents can consider the factors that give them strength or burden their everyday life. The aim is that, by identifying these factors, the parents can then change their patterns of thought and action if necessary. The questionnaire can be given to the parents to be answered and discussed at home. It is also possible to answer the short questionnaire during an appointment, as it does not take much time. (Klemetti et al. 2013; Hakulinen & Pelkonen 2017.)

### Psychosocial interventions that strengthen the resources and mentalising capacity of the mother and her spouse

The maternity clinic can provide preventive support to promote the attachment relationship between the depressed mother and her unborn baby by means of empowering discussion. It includes carrying out an interview with the mother and her spouse during the pregnancy to support interaction between the parent and the baby to be born (Puura, Sannisto & Riihonen 2018). The purpose of the interview is to promote positive early interaction between the baby and the parents. The interview helps to examine the family's need for support, and the interview itself can serve as a support measure. It is recommended to carry out the interview on a home visit during the final trimester (weeks 27–40 of pregnancy). It is recommended that the mother and her spouse both participate in the interview. (Puura & Hastrup 2017.)

The interview is carried out in accordance with a questionnaire containing statements that are discussed with the parents. The questionnaire form is an adapted



version of the Interview for Promoting Children's Mental Health by the European Early Promotion (EEP) project. The themes and questions in the questionnaire make it possible to identify and bring up conceptions and possible difficulties related to the pregnancy, baby and childbirth, as well as resources, sources of joy and concerns related to parenthood or the family's situation. (Puura & Hastrup 2017; Puura, Sannisto & Riihonen 2018.) The interaction between the mother and baby is strengthened by questions addressing the mother's pregnancy-related emotions and self-image as well as the expectations related to the unborn baby and the feeding of the baby. The interview includes questions related to the mother's mood. The objective of the interview is to identify any symptoms of depression and provide support for the mother and her family, where needed (Puura & Hastrup 2017.)

Korhonen and Luoma (2017) describe factors that convey and modify the connection between the mother's depression and the child's behaviour and emotional life in different phases of development. In addition to identifying and treating the mother's depression and providing social support, the mother's coping can be promoted during the foetal period by working on the parenthood-related representations, expectations and concerns. A parent's mind during pregnancy is characterised by flexibility and mobility. Parents are psychologically open to look back on their own childhood and their parenthood-related questions in a new way, which enables them to find new qualities in themselves, learn from previous experiences and mature as a person. The social and health care organisation Folkhälsan (2016) has developed the *Vauva mielessä* ('Baby in Mind') pregnancy diary in co-operation with the University of Turku, Turku University Hospital and the National Institute for Health and Welfare. The diary focuses on reinforcing the parent's reflective capability and mentalising. (*Vauva mielessä* 2014; Koskull et al. 2016.) The diary places particular focus on the parent's own experiences, thoughts, reflections and emotions, as they have a great significance for the development of the parent-child relationship and the relationship between the family members (Pajulo, Salo & Pyykkönen 2015). There is a specific reflective question for each week of gestation. They are related to matters such as the parent's current expectations, wishes or concerns as well as observations about the unborn baby and its well-being. Some questions are related to the effects of the parent's own actions and moods on the baby and other people close to her, as well as the effects of the parent's own childhood experiences on one's own parenthood. The mother may fill in the diary either alone or together with her spouse, other family members or a professional. Some maternity clinics in Varsinais-Suomi (Finland Proper) have tested the effectiveness of the diary. (Koskull et al. 2016.)

In a Finnish longitudinal study (The Finn brain birth cohort study), Pajulo (2015) and her team developed the P – RFQ questionnaire (Prenatal parental reflective functioning questionnaire) for the assessment of parental mentalising capacity. Construct validity was assessed against the PI (Pregnancy Interview) questionnaire. The objective was to prepare a cost-efficient self-report questionnaire for mothers and fathers to assess their mentalising capacity as early as possible already during pregnancy. The results of the study are promising, indicating that the questionnaire can be used

by maternity clinics and child welfare services for preventive infant mental health work and as an early phase screening tool when assessing the risk factors of parenthood and the need for support. The questionnaire itself can work as a minor intervention by inspiring parents for reflective thinking. (Pajulo et al. 2015).

## Group peer support

Prenatal group peer support may benefit depressed mothers in the prenatal period (Firth, Haith-Cooper & Egan 2016). In Finland, group peer support for mothers with mild pre- or postnatal depression is provided in *Iloa varhain* ('Early Joy') groups. The development of these group activities started in Vantaa in 2005. (Vuorilehto, Kuosmanen & Kumpuniemi 2010.) The working methods used in the groups are based on the cognitive-psychotherapeutic depression school group model, developed on the basis of the University of California's 'Control Your Depression' course (Lewinsohn, Munoz, Youngren et al. 1986, see Vuorilehto, Kuosmanen & Kumpuniemi 2010). For the *Iloa varhain* groups, the group model has been adapted to include themes related to the interaction between the mother and the baby, parenthood and maintenance of social relations. The group is particularly suitable for mothers with an increased depression risk, uncertainty with parenthood or a limited support network as well as very young mothers. The groups meet once a week for eight to ten weeks. The group consists of four or five mothers or mother-baby teams. The objectives of the groups include learning how to prevent and treat depression, supporting early interaction with the baby and providing peer support for the mothers. In the group, the participants learn to identify their personal emotions and moods, aiming to influence them by changing one's thinking or action. The group instructor may be a public health nurse, a family or social instructor, or a maternity clinic psychologist. The instructor must first complete the Depression School instructor training. (Vuorilehto, Kuosmanen & Kumpuniemi 2010.)

## Family welfare work by child health clinics

If the discussion or group peer support provided by the maternity clinic is not sufficient and the mother has mild depression, she may receive home help from the family welfare work services provided by the child health clinic. Family welfare work is short-term, free-of-charge discussion support for families expecting a baby and families with babies or toddlers. On a home visit, the family instructor can come closer to the family's everyday life to acquire an understanding of the family's values and attitudes, resources and mutual interaction. The family instructor's work involves participating in the resolving of family issues together with the public health nurse as well as promoting the long-term life management of families in need of special support. They assess families' need for support and help them to develop a network of support and services. When necessary, family instructors contact other municipal services, such as mental health or child welfare services. (Rautio 2016; Hakulinen et al. 2017; Borg, Kaukonen & Mäki 2017)

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Taizo Oshiro & Masatake Uno

## EFFECTS OF CLINICAL ART ON MENTAL ACTIVITY

### Introduction

Clinical Art (hereafter referred to as CA) is a non-pharmacological approach to art therapy that stimulates the senses through artistic and/or creative activities and aims to encourage motivation. CA originated in Japan in 1996, when an artist, a neurosurgeon and a counselor supporting care-giving families formed a team together with a facilitating coordinator. Since then, achievements in CA include non-pharmacological prevention, delay or slowing of dementia among senior citizens and effectiveness in nurturing a rich sensitivity in children.

It is estimated that Japan's senior citizen population will reach 36.57 million by 2025, and the number of seniors who are bedridden or in need of care will quickly rise to 2.7 million by 2025. The speed of aging in Japan is unprecedented, and because dementia among the elderly is a serious issue, CA is attracting attention from both the therapeutic and prevention perspectives.

The founder of CA, Kenji Kaneko, based the methodology of CA on “not only visualizing the subject but also experiencing it deeply using the five senses” and “expressing one's feelings in the moment as freely and creatively as possible.” This leads to the activation of both specific and broad areas of the brain and an overall increase in mental function. CA thus represents a different approach than psychotherapeutic art therapy.

Regarding the background of CA, it was early on dedicated to the alleviation and prevention of dementia, but in 2005, CA programs were also initiated for children.

CA methods are not limited to the medical and welfare fields, and are being used with evident effect in education, as well. Observed effects in children include building confidence, maximizing positivity, and fostering communication ability. In recent years, CA has also been practiced with a view toward “liberation of the mind” (a characteristic of CA) in a variety of arenas, such as care for children with autism, learning disabilities, or other developmental concerns, as well as mental health care within companies.

### Practice and Theory of Clinical Art Programs

The sculptor, Kenji Kaneko, was originally at the center of the CA movement. After his passing, many new programs were created through trial and review by several highly experienced clinical artists. A wide range of factors were considered in creating these programs, such as enjoyability/accessibility for a wide range of participants, richly inspiring themes, intriguing use of supplies and materials, free expression of individualism, and avoidance of bad odors or other unpleasantness. These new art programs were trialed, assessed for shortcomings and improved. The number of reported art programs developed in this way has now reached over 600.

### Clinical Art Programs

Clinical art programs are based on either pictures or three-dimensional (3D) sculptures and can be broadly grouped into two categories: “Motif Programs” and “Impression Programs.” The special characteristics of these two programs are introduced here.

1. **Motif Programs**  
In motif programs, participants observe natural subjects such as vegetables, fruit, fish, or plants prior to drawing them. The aim is not to sketch the actual object accurately, as in a typical sketch, but to discover the appeal and features of the motif and to honestly express what is felt. In CA, participants not only perceive the motifs visually but through the other four senses, as well—touch, smell, sound, and sometimes even taste. CA involves discussion of the materials (paper, boards, etc.), art supplies (media), and techniques appropriate to the task of clearly representing the perceived features of the motif. CA activities are also carefully designed to help participants feel a natural affinity and interest, increasing their desire to be creative.
2. **Impression programs**  
Impression programs do not involve drawing while looking at an actual object displayed in front of the participants. Rather, they involve a process of using the imagination in depicting objects by creating models on the basis of various themes. There are four categories of impression programs, each with a different approach to expression. Positive features of impression programs are that participants with memory loss do not become mesmerized by the motif in front of them; approaches can be easily individualized; and a feeling of freedom



develops when there is no sense of a need to draw well or accurately depict the motif. Similar to motif programs, through discussion of the program's approach, materials (paper, board, clay, etc.), medium (oil pastels, paint, etc.), techniques (dripping, frottage, or collage), and progress, participants naturally develop an affinity and interest and become passionately creative.

Art programs can be broadly divided into those involving 2D (flat) vs. 3D works. Some participants experience difficulty in understanding how to express an object in three dimensions. In this case, 3D sculpture and molding enables the use of materials they can feel and experience directly with their hands, unlike a flat surface. Using a tactile material makes it easier to express the object, and active participation is possible even in cases where description in words is difficult. Materials such as clay are easy to work with and enable tactile enjoyment through rounding, tearing, pinching, and attaching.

## Clinical Art Sessions: Framework and operation

To better explain the framework and operation of a CA program in context, we here offer a practical example—"An Analog Picture of Sound (Cambodian music)"—a class aimed at dementia rehabilitation in which a group of 6–10 participants meets with two to three clinical artists about three times a month.

### 1. Opening

#### Greeting

The session begins with greeting the participants. Individuals with Alzheimer's disease are often uncertain about the situation and ask questions such as, "Where am I?" and "Should I be here?" To lessen this uncertainty, we ensure that the layout of desks and seats is not altered from session to session. While greeting each participant individually, we note the changes in their condition and symptoms on that day. In each session we try to use the same approach, attitude, and words as if we were meeting for the first time. One clinical artist is appointed as the leader (main clinical artist) and drives the session, while other, assisting clinical artists (if present) take positions among the participants and speak from their perspective—asking questions when the main clinical artist's explanations are not sufficiently clear, etc. They thereby support the main artist and encourage the participants as they "run" alongside.

#### Singing songs

Singing songs further relaxes the participants. Here we choose songs pertaining to the theme of Cambodia. We select songs that participants can sing, taking their age into consideration. We introduce the lyrics, discuss their meaning, and encourage members to sing. If they do not sing, the assisting artists speak to the clients in a manner that helps them expand their imagination.



#### Introduction to art creation

Through questions such as, "Have you ever been to Cambodia?" and/or "What kind of place do you think Cambodia is?" we encourage participants to speak up. While observing photographs of the scenery, historical sites, etc., of Cambodia, we help participants overcome their inhibitions, be more spontaneous and develop their own images of Cambodia. The assisting clinical artists also talk with quieter participants, encouraging them to speak and participate in the art creation space.

### 2. Creation of Art

We begin with a demonstration. Demonstration is only the offering of ideas or possibilities, not instruction. We conduct demonstrations and provide explanations at each step of the drawing process. Creation of art follows the example process outlined below.

#### Painting the initial image as a base

We begin with a paintbrush. While listening to Cambodian music and being inspired by its sound, rhythm and their response to it, participants are asked questions like, "What kind of place is Cambodia?" They then paint bold, expressive lines, dots and surfaces to depict their feelings, with no pressure to paint a specific object. The participants' uncertainty disappears after making a pleasing line on the canvas, which also stimulates interest in what they will draw next.

#### Painting while drumming

Next, paints are applied to drumsticks and the participants paint with drumming motions as they listen to Cambodian ethnic music. Music is carefully chosen so the rhythm is compatible with drumming motions, and the participants can feel as if they are actually playing.



Clinical artists share the creative space and comment on the participants' works in progress. Supportively discussing and appreciating the works, the artists make specific comments, helping class members to relax and encouraging the creative process. Clinical artists have practiced creating such works in advance, so they share in the enjoyment of expression and can help participants work through difficulties to continue the expressive process.

### Changing media and adding to the picture

At this point, we change to oil pastels and continue adding to the painting. As the creative process nears an end, the participants build up a pleasing, expressive momentum and often add to their paintings autonomously. When a participant is unsure of what to do next, the clinical artist tries to intuit from the work what s/he is trying to create, and offers suggestions (e.g., color of paint) for the participant to consider in moving forward.

### 3. Art Appreciation

Everyone views the completed artworks together. During art appreciation time, the artworks are not evaluated as superior or inferior, but simply appreciated as pure works of art. The emotions and ideas stimulated by viewing the artworks are conveyed to the individual artists and to the entire class. Clinical artists do not comment from an instructional perspective, only thoughts on their inherent qualities as art. Finally, participants are dismissed with encouraging words such as, "Please come again," and "We look forward to seeing you again."



## The Clinical Artist's Attitude

Clinical artists begin an art program with a verbal explanation of the its themes.

However, when it is difficult to convey the message through words, clinical artists use composite methods to stimulate the senses and convey the theme, including movements/gestures (visual sense), touching of motifs (sense of touch), even flavors (sense of taste) and aromas (sense of smell). Clinical artists also speak slowly so clients can talk about the scenes and memories they recall as the topic is presented. This is a step in creating artwork, but the aim is not completion of artwork. The central purpose is for the clients, clinical artists, and other participants to spend meaningful time together.

When participants wander from the program themes, clinical artists should not demand conformity, but consider the needs of the client. The aim is to build a sense of sharing together in order to better understand the client's confusion and satisfy their needs. This facilitates personal expression that only that individual can offer. If clients express themselves only in the instructed manner, their expression will naturally lack individuality and create no sense of achievement. In CA, while the clinical artist may offer a wide range of suggestions and possibilities regarding colors to choose, scenes to depict, etc., it is important leave the emotional and intellectual responses and decisions to the clients.

When participants truly connect with the idea that "everyone is an artist," they become able to share and engage with one another's' unique sensitivity. Even if individuals with dementia no longer understand the context of the discussion or the concept of time, they are aware of the present moment. The moment when participants proudly showcase their completed works is the moment that they feel the irreplaceable "now" from their works because participants with AD tend to live their present.

## What effect does Clinical Art have on mental activity?

Based on observation during CA, we assessed the effects of artistic activities on the mental activity of participants with Alzheimer's disease using the following three criteria:

1. Can they concentrate on artistic activities?
2. Can they retrieve past memories or knowledge?
3. Can they regain some ability to understand and make a decision?

### 1. Concentrating on artistic activities

As Alzheimer's disease progresses, sufferers increasingly spend their time in a daze, doing little or nothing all day. Reduced energy, apathy and inactivity are symptoms commonly recited by families of CA participants. We notice, however, that many patients with even mid-stage Alzheimer's can approach the artistic task of drawing or painting with serious, focused attention. They understand what they should do and are able, if interested, to concentrate. Even those with little experience of artistic activity can thus enjoy and benefit from creating artwork if given the opportunity.

As mentioned above, drawing begins with looking at the subject (motif), involving not only focusing on the subject's shape, surface and color, but also sensing its brightness and freshness, darkness and age. However, CA does not only involve visual observation. The subject is also experienced using the senses of touch, hearing, taste, and smell. The sense of touch is particularly important. It involves feeling the surface of the subject to gauge its texture and holding it to gauge its weight. This enables participants to perceive "this moment and this place" more deeply.

They then draw their impressions of the subject and what they felt when perceiving them. Adherence to the shape of the subject is not required. However, there are those who adhere to the shape and are concerned about how well they have drawn it. In such cases, as mentioned above, we sometimes have participants listen to music or various sounds and draw what they felt or thought about while listening. In this case, the subject has no "shape," and participants can relax and concentrate on their work without fretting about accurate depictions.

When encountering subjects through their five senses and creating abstract representations of their feelings, even participants with conditions such as visuo-spatial cognitive impairment can focus on creativity. Even patients with mid-stage Alzheimer's disease (AD) who seem to have lost interest in their surroundings display a dynamism in their eyes as they concentrate on their work for surprisingly long periods. However, we do see a drop-off from late mid-stage onward, as clients take an increasingly long time to engage with the subject and are often indecisive about how to proceed with their work.

### 2. Evoking memories

Before beginning artistic activities, the clinical artist explains the day's theme while showing participants the photographs and materials to be used. Until early mid-stage, Alzheimer's patients retain memories from their childhood and adolescence relatively well. They also retain some knowledge gained during school days (semantic memory). In particular, they can recall songs, lyrics, and words from haiku and other poems they learned at that time. To stimulate participants' emotions, clinical artists link discussion of the day's theme with clients' past knowledge and singing of related songs. If these emotions and mental images linger as clients begin drawing pictures, these memories may be depicted on the canvas—for example, places they

have visited or proverbs they have heard. Impairment of declarative memory is very evident among many AD patients, but procedural memory expressed through motion is retained comparatively well.

Another interesting, memory-related effect of CA involves patients' ability to make technical progress. Although AD patients with slowly progressing symptoms have memory impairment, progress in their technical art skills is possible. Many patients make gradual gains in richness of expression. At one of CA session, Kaneko and his colleagues taught patients with AD how to draw croquis, a quick sketch of people.[1] For 10 months they continued these quick lessons before starting the day's main program, and they reported major progress in key elements, such as the basic approach to drawing a quick sketch, how to locate the center of gravity, and depicting major body movements.

### 3. The experience of decision making and expression through art

CA programs are divided into a number of steps. At each step, clients are shown how to draw lines and use colors, but the specifics—such as the type of line to draw and the colors to use—are left to the participants. The clinical artist may help when clients are unsure, but we encourage the clients to make the final decisions. As dementia progresses, and clients have fewer and fewer opportunities to make decisions in daily life. Because of their difficulty understanding their circumstances, family members or caregivers tend to take control, leaving few decisions to these patients. With no confidence to make decisions on their own, they tend to increasingly ask their caregivers' opinions. Even in consultations, when asked a question, patients often look to their caregivers for answers.

Because no judgments are made in CA regarding shapes, colors, etc., patients can make relaxed choices. And as they make decisions, they feel confidence in their own actions. Repeated, independent decision making is a highly significant experience, facilitating concentration and enjoyment. Regardless of the severity of their disease, patients with AD can concentrate on drawing and creating and enjoy artistic activities even though they may require more one-on-one support. Many participants also increase their expressive abilities—both verbal and artistic. In addition to strengthening their capacity for understanding and decision making, these creative activities also are remarkably effective in stabilizing the emotions of participants and reducing their sense of isolation through the supportive, group-nature of the activities.

### Artistic activities increase well-being

Artistic activity is a type of non-pharmacological intervention for patients with dementia that improves QOL—the major goal of non-pharmacological interventions.[2] QOL for patients with AD is evaluated both objectively and subjectively.





[3] Objective evaluation involves the environment (e.g., room size) and the patient's ability to act. Ability to act comprises instrumental activities of daily living (instrumental ADL) such as arranging meals and shopping, as well as fundamental ADL (basic ADL), including eating meals, maintaining hygiene, and using the toilet. Subjective evaluation involves the psychological well-being of the patient in everyday life. Facilitating a sense of psychological well-being is one of the goals of artistic activities. AD patients participating in one art program (Memories in the Making), were found to express their emotions more easily and fully than those in regular day-care.[4] Besides the ability to express emotion, there are also reports of more positive emotion, increased motivation and improvements in sociability and relaxation.[5]

Because QOL assessment is a subjective evaluation by the observer, psychological well-being is a particularly important aspect.

### Increasing self-esteem through self-expression

Patients with AD frequently act or react in inappropriate ways in their daily lives, often embarrassing their caregivers and inciting warnings from them. Scolding may be unavoidable when they violate norms or cause trouble for those around them. But they have a heavy price in lost pride/self-esteem. In CA sessions, the aim is not to produce superior artwork but for participants to freely express their feelings. The artwork each participant produces is evaluated as an expression of his/her thoughts and feelings. No work is compared with another, but the patient can still enjoy the

feeling of producing a great piece of art. The clinical artist guides the participants to more richly express their feelings. When participants can freely express their own feelings and feel the joy of creativity and artistic performance, even for a short time, their self-esteem is preserved and even enhanced.

As one can see, we are here framing well-being, not in the sense of assessing the expression of separate emotions and desires—interest, joy, sadness, concentration—but from the perspective of how self-respect can be increased through expressing oneself and how communication ability can develop through artistic activities.

### Enabling better communication to avoid a sense of isolation

CA is a group activity emphasizing communication. Participants with AD cannot produce work on the basis of only one explanation. As their condition worsens, they often do not clearly understand what they are being asked to do. To compensate, clinical artists take positions among the patients and repeat the explanation in easily understood ways while looking together at the subject or artwork in front of them. Once the artworks are completed, art appreciation begins as the clinical artists, patients and their families share their thoughts and impressions. Again, this is not an occasion to compare or rank the artworks, but to share the artistic activity and experience the artworks together. In this way, CA is full of sociable communication; the participants always feel accepted, and there is no sense of isolation. Thus, creative artistic activities have a positive influence on the well-being of participants and their family members by soothing their feelings and decreasing feelings of isolation through a warm, affirming community experience.

### Conclusion

As AD progresses, sufferers have difficulty understanding situations and communicating in a logical way. Their thought life is compromised. Thoughts can be classified as convergent and divergent.[6] The former involves focusing on a problem and logically reaching a single conclusion, as when solving a math problem. Divergent thinking, on the other hand, involves generating multiple, varying conclusions and is important in creative activity. Because of their pronounced memory impairment, patients with AD have great difficulty with convergent thinking. However, up to a certain stage, AD sufferers often retain a greater facility for divergent thinking, making artistic activities in “this moment and this place” possible.

Such creative, artistic activities tend to positively affect the emotions and motivation of patients with AD, improving their well-being. Furthermore, communication with those around them is deepened through group activities, and heart-warming emotions are shared with others. This decreases feelings of isolation and brings them joy.

As described above, what are the key concepts of CA? They are, “Connection between people through art” and “Community-based service through art.” It is thus very important to provide such services as integrated components of comprehensive, local community care.

### Acknowledgments

This paper was written drawing heavily on *Clinical Art - Cognitive Rehabilitation through Art Activities* (edited by Masatake Uno, Kiyoko Nishida, published by Japan Clinical Art Association, 2015) to which the author contributed.

I would like to express my thanks to the following individuals in the Institute of the Formative Art Co., Ltd., and the Japan Clinical Art Association: Dr. Masatake Uno, Mr. Kazunori Aoki, Dr. Norihito Kawai, Mr. Yu Hosaka, Mrs. Kiyoko Nishida, Dr. Nobuhide Watanabe and the late Dr. Kenji Kaneko.

Note: Kenji Kaneko founded his joint workshop in 1976. While sculpting in collaboration with other artists, he began conducting sculpting classes for children the following year (1977). He emphasized expressive activity that aims at true artistic education, touches real art, and liberates the self. From 1996, he put great efforts into practical research on clinical art and the training of clinical artists.

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Hannele Niiniö, Johanna Holmikari & Anita Alanen

## ENCOUNTER ART BOOSTING WELL-BEING AND LEARNING

The main goal of this article was to test and evaluate a new educational concept that combines well-being and Encounter Art. The writers planned and organised two pilot training sessions, which took place in the autumn 2017 as part of the Digital in Care Services project. These training sessions combined two elements: improving participants' occupational health by using Encounter Art and combining it with theoretical knowledge about occupational health.

Based on the participants' responses, it became apparent that participation in the training was significant and promoted well-being at work. The trainers' observations supported the response, as the atmosphere in the group and the positive attitude towards the occupational health topics were clearly visible.

The main result was that Encounter Art created learning bridges by facilitating learning through tuning, supporting trust and communality in the group and thereby securing learning. Art also creates links with the meaningfulness of learning. A relaxed and open mind makes it easier to process new information. Both Marjo Räsänen and Susan Coppola have found the same kinds of links between positive feelings and learning when using art-based methods (Räsänen 2010, 50; Coppola 2017).

The group members, including care workers and female leaders, had many common experiences: a break away from work, a positive atmosphere in the group and

sharing experiences. The concept seemed to work in both groups and in the managers' group they could use the group more deeply as a source of peer support.

The responses confirmed the perception that art-based work was a bridge by which participants could calm down and take on new things. New learning cannot succeed when thoughts are elsewhere and the brain is in a stressed state.

### Common elements in well-being and learning

Based on our own experiences and the results of some research, creative methods in learning situations activate and motivate learners and help to increase interaction in the group. Motivation is fundamental in learning and it is based on the fulfilment of the psychological needs for autonomy, competence and social cohesion. The fulfilment of these needs also creates the foundation for well-being. Autonomy means feeling that you are able to make changes with your own actions. Competence means a person feels life management which makes it possible to achieve one's own goals. Cohesion means a person has the feeling of being part of a group or groups (Ryan & Desi 2000; 68-78). Based on Järvillehto (2014; 35-38), these elements are crucial in sustainable learning. The biggest effect on learning comes from the experience of competence and especially the optimal state of competence known as flow. In flow, says Mihaly Csikszentmihalyi (1990), thoughts, intentions, feelings and all the senses are focused on the same goal and the total experience is in harmony. When the flow moment or episode is over, one feels more united than before, both internally and in relations with and in respect to other people.

### Art supporting learning

Marjo Räsänen (2010, 50) refers to art and skills as tools to help other educational goals. Learning through art is based on the idea of holistic learning where art is seen as one of the ways of knowing alongside other ways. A comprehensive learning process does not differentiate between art and skill.

The art of teaching can also be linked to the concept of creativity. As teaching approaches from the point of view of creativity and play, the importance of emotions, sensuality and humour is emphasised in learning (Räsänen 2010, 57-58). From this point of view, art-based activities play a key role in learning. Through art-based activities, various positive feelings are strengthened and thus learning is facilitated. Susan Coppola's (2017) article explains that art-based learning experiences have demonstrated a range of benefits, including improved observation skills and perspective taking. Her article describes the effects of an art-based module in an entry-level curriculum for occupational therapy (OT) students. This pilot study investigated the feasibility of a group administered visual art-based module in a group of 20 first-year OT graduate students. The students' stated that art-based sessions

increased the opportunities to practice perspective shifting, tapped into emotion, gave examples of therapeutic encounters and “out of the box” thinking. Coppola summarises by saying that complementing coursework with art-based teaching helped to build an understanding of clients, creative thinking and valuing learning experiences.

The findings support the results of other art-based pedagogies, such as Frei, Alvarez and Alexander (2010), who have used visual arts in nursing studies. A defined visual art experience was used to improve professional nursing students’ observational and communication skills, narrative sequencing abilities and empathy. Qualitative evaluation measures from the students suggested this was an experience that broadened their understanding of patient encounters.

### Encounter Art as part of the Digital in Care Services project

The origin of Encounter Art is found in Japanese Clinical Art that uses visual art with client groups of all ages and also, for instance, in work welfare. Laurea UAS has conducted close co-operation for more than 12 years with Tohoku Fukushi University, developing a “sister” model to Clinical Art.

In Encounter Art, the essential features are perceptions, experiences, meeting each other, joy and appreciation. The structure and multisensorial and often surprising art methods help the participants to focus time, place and art making. In an instructed and goal-oriented visual art group, the art work will form through different steps and choices to an aesthetic art work. In Encounter Art, joy and pleasure are consequences of experiences of the aesthetic nature. Doing and working with materials is empowering (Pusa 2014). In Japanese Clinical Art, one of main conclusions of the developers was that in art-making the joint effect of joy and stress is empowering (Musha et. Al 2000).

In the Digital in Care Services project, 2015–2017, at Laurea University of Applied Sciences, the main goals were to improve digitalisation and occupational health in small, private care service enterprises. To meet these goals, training was organised in 2016 for care workers to instruct rehabilitative groups for clients combining digital solutions and devices. At the training, every session began with an Encounter Art session. In the feedback survey, participants stated how important this art-making was for the rest of the day, helping them to concentrate on the more digital part and new issues for them. Some of these participants wrote that they understood the importance and meaning of creativity. Following to these comments, we decided to collect more data in future training sessions on what kinds of elements would arise when starting training or seminars using art-based working.

### Encounter Art-based concept

In developing an Encounter Art-based concept, we had many questions: What impact would the use of Encounter Art have at the training level? How would it work to combine Encounter Art and work well-being and its learning? In general, in well-being at work training, the purpose of the activity is either to relax or to concentrate on increasing the knowledge about topics of work well-being. In this training, we combined these two elements. This is also the first time that Encounter Art was used as part of work well-being education. We are interested in finding out how participants describe their experiences during the sessions and does Encounter Art have some impact on learning and well-being.

First, it is worthwhile explaining that we understand learning as a holistic approach that is closely tied to the participants’ feelings and the social environment. Learning does not only confine itself to cognitive functions in a very comprehensive approach to learning. Learning also involves emotions. Eija Kauppinen (2016) states that there is a shared understanding of learning as primarily the result of the learner’s actions and interactions with others and the environment. Because learning is interactive, feelings have a very special meaning in learning and in the learning process. When learning involves a mood experience, positive feelings can also be supposed to increase learning and well-being. The positive experience of self-knowledge and creativity that has emerged in encountering through art also creates the foundation for a growing self-awareness and the feeling that “I can”. One of the key pillars of well-being at work is the ability to identify one’s own resources and expertise.

The idea of art as a facilitator of learning is also central to a holistic concept of learning. The idea of art as a bridge to learning is a good reflection of our thoughts on how Encounter Art worked in a group to support, accelerate and induce different processes. Next, we will describe the pilots and results based on the data collected from the point of view of tuning, motivation, positive emotions, activity and work welfare.

### The training groups and data collection

The test pilot to try this new concept was organised in the autumn 2016 in the Digital in Care Services project. In this training, the themes were group-leading skills combined with digital tools. Every training session began with an Encounter Art workshop, and after that the more thematic work. Encounter Art was always linked to group-leading skills. Feedback from the participants was so positive that it encouraged the project workers to plan new training sessions in the autumn 2017.

The main goals of this article were to test and evaluate the new educational concept and way of working in training groups. In these two pilot groups, we combined two

elements: improving participants' own occupational health by using Encounter Art activities and combining it with theoretical knowledge about occupational health. In this article, we used data collected from two training sessions that took place in autumn 2017. The research question was: What kinds of experiences do participants describe concerning the concept of combining art-based working and theory in training sessions? The first group was made up of four female leaders of social care service companies. The second included 19 workers from care services. The participants were asked for their written permission to take part in the research and they almost all gave it. The final participants in the study were four people in the leaders' group and 15 people in care workers' group. The ages of the female leaders ranged from 40 to 60, and three of them had worked for approximately 20 years as leaders in the social and health care sector. One participant had just started working as a leader. The ages of the care workers ranged from 22 to 60 years. Two of the participants were male and 13 were female. These training sessions were part of the Digital in Care Services project.

The data collection measurements were qualitative narrative inquiry after every three training sessions in both groups and trainers' observations. Narrative-based inquiries gave the participants the possibility to explain their experiences using their own words. In this article, the data is based on the participants' descriptions of what they felt about the effects of art-making in education and the experiences they had with the education. The participants responded to the same questions after each meeting. The resulting resistors were assembled and structured by means of content analysis to achieve more a comprehensible understanding. When analysing the data, the content analysis method was used. We use the codes L and E to mark data from different groups, L = Leaders (a–d) and E = Employees (a–o).

In the actual pilot groups in autumn 2017, this kind of art-based working was new, except for one participant who had previously been in Encounter Art workshops. Participants in both groups were first surprised but mostly in a good spirit. Before the training sessions the trainers received questions about the working methods and some participants were concerned they might be getting into something too strange.

These 15 participants came from different care service units, and some from the same units. This created an interesting dynamic for the group because the group members partially knew each other and some did not.

After the art work came a more theoretical part that consisted of different themes in occupational health and their roles in their workplaces. The themes and teaching methods were adapted according to the participants: care workers did more group work and shared activities in small groups. The leaders' group took two approaches: their own and also their workers' occupational health. Being a small group, the discussions in the leaders' group were more analytical and supportive because they seldom have the possibility to share issues with their peers. In both groups, there

was a lot of discussion and co-operation, which broadened the perspectives when hearing about the situation in different care facilities.

## Experiences of the group of female leaders about the new concept

A common factor that all participants reported was that they felt it was most important to share their experiences as leaders, which they seldom can, and especially with people who are their counterparts and whom they can trust. They felt it was important to listen to the opinions of others, and they enjoyed the atmosphere and relaxed feeling in the training sessions.

*"To hear others' experiences about working as a manager, peer support." (L.d, session 1)*

The size of the group was important as the participants appreciated that. It made the atmosphere more intimate and it was easier to share rather personal matters considering your work, taking care of your own occupational health and also of your workers. The feeling of being able to talk about work issues with others who know what you are doing and what challenges you are facing added something special to the experience of peer support.

*"The wise comments of others and positive atmosphere." (L.b, session 1)*

The participants' experiences of the effects of art-making could be categorised: free from every-day-issues, inspiring effects, meditative effects and increased notifications of different ways to act.

*"It lifted my spirits, inspiring." (L.b, session 3)*

*"(Art-making made me) more free, inspired me, and it had meditative effects." (L.a, session 1)*

## Experiences from the group of care workers

The participants were very heterogeneous and the participants came to the group with very different expectations. For learning to be possible, each participant should feel safe and the learning environment should be inspiring and tuned in to learning. Experienced group instructors were surprised at how quickly the group formed a good team spirit and the group members worked smoothly in co-operation with each other.

While the way of working was new, the care workers were at first a little surprised when they started the art working. Afterwards, one of the participants wrote that to begin with she felt it was total nonsense. In the end, she was positively surprised. The other participant greeted herself of being brave enough and winning herself.

Also the concept of starting the training by making art was new and raised questions to begin with. One employee (E) describes that hardest part as attending the group:

*"It was hard for me to participate. I am afraid of attending a group where all the people are strangers." (E.j session 3)*

Something happened during the sessions because the participant responded that doing art in the sessions gave inspiration to stay, and it gave confidence to be among others.

*"I was positively surprised. I got self confidence that I can manage with people whom I don't know." (E.j session 3)*

In art making, many participants at first had to step out of their comfort zone. Many of them had a strong prejudice against visual art making. Apparently, the surprising elements, guided way of working and aesthetic art piece were mostly very positive elements.

*"I had a good feeling, although I was terrified at first." (E.k session 2)*

*"I had a prejudice, but this was nice." (E.k Session 3)*

Each participant could choose their own level of commitment and the intensity of participation. It is easy to be a part of Encounter Art and participants may easily be absorbed into the work, as if by accident, so the effects of participating in the art activity may even be a positive surprise. Participants also described the art work's positive impacts:

*"It was a different start to the day and a good way to get to know the group." (E.i session1)*

*"Yes, I had a good feeling and it was nice to discuss occupational health themes, among other things, after starting the day by doing." (E.a session 1)*

*"Inspiring and relaxing." (E.d session 3)*

## Common results from both groups

The group members among the care workers and female leaders had many common experiences: 1) a break away from work and tuning into learning, 2) a positive atmosphere and meaning of the group, 3) sharing experiences and networking and 4) trust and peer support.

Tuning into or orienting to new issues is an important factor in learning. To be able to draw your attention towards a new thing, it is good to make the mind adapt to new things. Participants in well-being at work training came in a very hectic and busy working day, with many things on their mind. The commonly shared experience was that working life is very burdensome and busy. From this state of mind,

it is a long way to a feeling of being relaxed and open to new knowledge. Many participants describe how they felt relaxed, they were able to concentrate on new things, and the possibility to get away from work-related matters and the stresses of the day. Engaging in art working brought about thoughts and receptivity to a new level.

*"Getting a break from work! To go somewhere else, today was a pretty busy day." E.g session 1*

*"The art doing was nice and got creative; did not have to know anything." (E.a session 1)*

*"Art working surprised me positively. I got the experience of success! And my thoughts were elsewhere." (E.g. session 1)*

The support and atmosphere of the group is also of great importance for learning something new. The social nature of learning became visible also in participants' responses. Acquiring new things and perspectives was easier with the help of the group, but also a good group allowed relaxation, support and empowerment. The respondents described the importance of the group in several different responses. The most important features of the group are: doing things together, networking and sharing, positive atmosphere, trust and peer support. The positive atmosphere that formed in the group was also considered important:

*"A relaxed atmosphere and joy and laughter." (E.d session 3)*

*"That the atmosphere was positive and relaxing." (E.e session 1)*

*"Be together and change thoughts." (E.g session 2)*

*"Making art was fun and helped me get to know new people." (E.n session 2)*

Trust and peer support was clear result in the female leaders' group. The small group helped the atmosphere of trust, and they also had familiarity with the methods in supervision at work that were used while the trainers in the group were both supervisors.

*"Discuss and listen to what work ability means to others who are the same as you." (E.e session 1)*

*"Common trust in sharing experiences, peer support." (L.c session 2)*

However, a good group atmosphere does not arise from itself. The functioning of a group requires the interaction of many factors, but there are also ways of promoting the group's activities. The trainer plays a key role in this and the data from these pilots shows that the use of art-based activities played a big role in helping the group in working together. The concept seemed to work in both groups and in the leaders' group they could use the group more deeply as a source of peer support.



## Conclusions

The data collected confirmed the perception that art-based work was a bridge by which participants could calm down from work issues and concentrate on new things. New learning cannot succeed when participants' thoughts are elsewhere and the brain is in a stressed state. Therefore, tuning into learning creates not only a readiness to receive new knowledge and perspectives but also one's own well-being at work. We believe that the strong role of Encounter Art in this education has given a new learning platform, in which the participants were relaxed and open-minded and motivated to start thinking and learning about the themes of well-being at work. Joy, laughter and a common trust in the sharing of experiences are the elements that are needed to promote work welfare.

The premise was that making art as a part of group activity would in some way contribute to the group's togetherness and confidence. One of the key principles of Encounter Art is to support the group and create trust among the participants. Encounter Art also increases the communality of the group, so for the group's activity it had a clearly positive effect on group dynamics. Learning is also improved when the learning atmosphere and group support are strongly felt. The participants explained it was nice to do things together. The group helped to participate, to overcome oneself and to do something different together.

The data showed that Encounter Art helped the participants to learn new things by tuning in and that learning expands when participants get the chance to have break from work and increase their own work welfare with peers. Therefore, it is good to have the means by which the participants are offered the opportunity to escape from the urgency and stress of the mind and to open their minds to learning and seeing new things.

Art-based methods, such as Encounter Art, are suitable for all groups and they do not require previous knowledge about art-making. Therefore, they can be easily adapted to learning processes, although requiring special skills of teachers. By making art, learners can meet their hopes and strengths. In learning and also in work well-being, courage, creativity, motivation and communality are important elements, and all means to support them are beneficial.

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Takayuki Kawamura

## KEEP FIT WITH KARAOKE FOR THE ELDERLY

### Background

Karaoke, which originated in Japan, has now become established in various countries around the world. However, the size of the karaoke market in Japan has been decreasing since 1994 owing to the recession, diversification of entertainment, and so on. The annual number of karaoke participants at commercial establishments (karaoke boxes) has remained at around 47 million since 2000. In 2015, those over 60 years old accounted for 14.1% of participants, a 3.6% rise from five years earlier (Karaoke Business Association, 2018).

There are a number of markets for karaoke equipment—taverns, karaoke boxes, ryokans & hotels, elderly welfare facilities, and others. From 2016-17, sales grew in only two markets: taverns (¥120.5 billion to ¥124.2 billion) and elderly welfare facilities (¥10.6 billion to ¥11.1 billion) (Karaoke Business Association, 2018).

The Ministry of Health, Labor, and Welfare emphasizes that the maintenance and improvement of three factors—exercise, oral health, and cognition—are the pillars of comprehensive lifestyle improvement among the elderly.

As various kinds of exercise and movement activities aiming at promoting health and preventing the need for health/long-term care among the elderly are gaining popularity, it has become clear that exercise incorporating music has the effect of even further improving cognitive function.

Dai-ichi Kosho Co. Ltd., a leading karaoke enterprise, has developed the DK Elder System, an interactive karaoke system aimed at advancing the “health karaoke



**Figure 1.** The DK Elder System (<https://dk-eldersystem.com/index.html>)

business.” It effectively utilizes music and video to facilitate exercise and enjoyment of karaoke toward the larger goals of long-term care prevention and overall health.

The DK Elder System makes it easy for facilities to create health enhancement programs. As of June 2016, about 19,000 units had been installed in welfare and nursing care facilities nationwide.







### “Using the body” content development








Tohoku Fukushi University (TFU) and Dai-ichi Kosho Co. Ltd. have been conducting joint research and development with the DK Elder System (Tohoku Fukushi University, 2013). Implementing the DK Elder System for health maintenance, prevention of the need for health/long-term care, and community empowerment are our main research themes. The health-enhancing effects of the DK Elder System have been extensively tested at nursing homes, karaoke boxes and various meeting places. Our research has shown that general health, quality of life, and brain function are maintained or even improved among elderly participants (Kawamura T, 2015).

In addition, based on research results and practical experience at nursing care facilities, original programs and content effective for health/long-term care prevention and health promotion are being developed. The DK Elder System is configured to keep participants enjoying pleasant music every day. Verifying the effectiveness of musical fitness programs in the nursing care setting, we are creating “recommended programs” that automatically combine effective recreation methods and audiovisual content. TFU’s original content and recommended programs have been collectively named, “Everybody’s GENKI juku.” “GENKI” refers to a source of motivation and ability to overcome hardship. “Juku” refers to a place of learning and growth.

Everybody’s GENKI juku introduces exercise appropriate for the target audience, is easy to follow, and makes exercise enjoyable in association with music.

**Table 1.** Examples of content from Everybody's GENKI juku

ICEBREAKER EXERCISE	
CONTENTS	IMAGE
THE FIRST HALF IS AN EXERCISE IN WHICH THE PARTICIPANT STRETCHES OUT HIS ARMS TO REACH THE IMAGE, EVENTUALLY TOUCHING IT. THE SECOND HALF INVOLVES RHYTHM PLAY FOR TWO PEOPLE. THEN COMES EXPANDING THE RANGE OF MOTION OF THE SHOULDER JOINT, WHICH IS REQUIRED TO HANG THE LAUNDRY, AND AIMING TO INCREASE MUSCLE STRENGTH TO RAISE THE ARMS. IMPROVING AGILITY BY MOVING THE BODY HAPPILY IS EFFECTIVE FOR THE PREVENTION OF DEMENTIA.	
SWINGING THE POMPOM ACCORDING TO THE RHYTHM, AS WELL AS THE GENERAL BODY MOVEMENT, IS EFFECTIVE IN IMPROVING AGILITY AND PREVENTING DEMENTIA. IT CAN BE PERFORMED AS A GROUP ACTIVITY.	
WARMUP EXERCISE	
BEFORE STARTING EXERCISE, PARTICIPANTS ENGAGE IN GYMNASTICS TO CHECK THE CONDITION OF THE BODY AND JOINT MOVEMENTS. THE FIRST HALF CONFIRMS THE MOVEMENTS OF THE JOINTS OF THE UPPER LIMBS, SUCH AS THE WRISTS, ELBOWS, AND SHOULDERS. IN THE SECOND HALF, WE WILL CHECK THE CONDITION OF THE KNEES AND HIP JOINT WITH MOVEMENTS CENTERING ON THE LOWER LIMBS.	
THERE IS A LOOSENING OF THE JOINTS OF THE UPPER LIMBS WITH MOVEMENT AND BY WIDENING THE RANGE OF MOTION. IT IS ALSO EFFECTIVE IN "UPGRADING YOUR BODY'S ABILITY" WITH FAST MOVEMENT. PARTICIPANTS GUESS THE INSTRUMENTS INVOLVED IN THE MUSIC BEING PLAYED AND ACT THEM OUT THROUGH BODY MOVEMENTS.	
THE JOINTS AND MUSCLES OF THE LOWER LIMBS ARE STIMULATED WITH ANIMAL MOVEMENTS. THIS IS AIMED AT PREVENTING STUMBLING AND FALLING THROUGH MOVEMENTS THAT EXERCISE THE SHIN, CALF, AND THIGH.	
SMOOTH MOVEMENT AROUND THE HANDS, SHOULDERS, AND BACK PROMOTES BLOOD CIRCULATION. PARTICIPANTS' COMMUNICATION IS ALSO ENHANCED BY MOVEMENTS SUCH AS KEEPING THEIR HANDS TOGETHER BESIDE THEM.	

MAIN EXERCISE (AEROBIC FITNESS, BALANCE, RESISTANCE TRAINING)	
STRETCHING OF THE UPPER LIMBS AROUND THE SHOULDER JOINT AND SHOULDER BLADES WIDENS THE RANGE OF MOTION OF THE JOINTS AND PROMOTES BLOOD CIRCULATION, IDEAL FOR BODY LOOSENING BEFORE THE MAIN EXERCISE.	
MOVING THE MUSCLES AROUND THE MOUTH IS AIMED AT IMPROVING ORAL FUNCTION, SUCH AS CHEWING, SWALLOWING, AND SPEECH. BY MOVING THE BODY ACCORDING TO THE FACIAL EXPRESSION, BOTH THE FACE AND BODY ARE WARMED UP.	
THREE KINDS OF MUSCLE TRAINING TO BE DONE IN PAIRS. WE WILL AIM TO STRENGTHEN THE BODY TRUNK, FINGERS, AND ARMS, WHICH ARE NECESSARY FOR DAILY LIFE. IN THE PROCESS, PARTICIPANTS' RELATIONSHIPS WILL DEEPEN.	
A TOWEL IS USED TO MAKE A LARGE MOVEMENT TO LOOSEN THE ARMS, SHOULDERS, AND BACK AND WIDEN THE RANGE OF MOTION OF THE JOINTS. IT STIMULATES THE NERVES IN THE FINGERTIPS BY PULLING TO MAKE "DRAWING," "TYING," AND "SPREADING" MOVEMENTS, AIMING AT IMPROVING THE KNOB STRENGTH.	
WITH A SIMPLE WARMUP AND A LARGE MOVEMENT USING A TOWEL, YOU LOOSEN THE ARMS, SHOULDERS, AND BACK AND WIDEN THE RANGE OF MOTION OF THE JOINTS. BY MAKING GRASPING, SQUEEZING, AND PULLING MOTIONS WITH THE TOWEL, WE AIM TO INCREASE THE MUSCLE STRENGTH NECESSARY FOR DAILY LIVING MOTION.	
THREE MOTIONS (STANDING ON ONE LEG WHILE LIFTING AND LOWERING THE OTHER LEG WITH HEEL UP) ARE AIMED AT PREVENTING LOCOMOTIVE SYNDROME (EXERCISER SYNDROME) WHILE IMPROVING BALANCE AND MUSCLE STRENGTH IN THE LOWER LIMBS.	
THE DUMBBELL EXERCISE AIMS AT IMPROVING GRIP STRENGTH (GRASPING/PINCHING FORCE) AND ARM STRENGTH, WHICH ARE INDISPENSABLE FOR EVERYDAY LIFE. IT IS ALSO EFFECTIVE IN ACTIVATING THE BRAIN AND NERVES BY MOVING THE FINGERTIPS.	<p>行きっこなしよ</p> 







**Table 2.** Each brain address, its functions, and corresponding characteristics

BRAIN ADDRESS		BASIC FUNCTION	PERSONAL CHARACTERISTICS
FRONTAL LOBE	1. THINKING SYSTEM	THOUGHT, MOTIVATION, JUDGMENT, CREATION	PERSEVERANCE OF THOUGHT; CAN COME UP WITH IDEAS IN ANY SITUATION.
	2. EMOTIONAL SYSTEM	EMOTION, PREFERENCE, APPRECIATION, COMPASSION	HIGH SOCIAL ABILITY, APPRECIATION, AND COMPASSION.
	3. TRANSMISSION SYSTEM	OPERATION OF SPEECH, WORDS, AND VISUAL IMAGES	STRONG COMMUNICATION SKILLS AND COMMAND OF VOCABULARY AND EXPRESSIONS.
	4. MOTOR SYSTEM	EXERCISE, PHYSICAL SENSATION	ABILITY TO PLAN, FORM A PROFOUND UNDERSTANDING OF SITUATIONS, AND CONTINUE TOWARD A GOAL.
PARIETAL LOBE TEMPORAL LOBE	5. UNDERSTANDING SYSTEM	COLLECT AND UNDERSTAND INFORMATION	ACCEPTS VARIOUS PERSPECTIVES, UNDERSTANDS DEEPLY, AND PERSEVERES IN LEARNING.
OCCIPITAL LOBE	6. MEMORY SYSTEM	MEMORY, RECALL	GATHERS INFORMATION PRECISELY, ACCUMULATES KNOWLEDGE, AND PRODUCES IT WHEN NECESSARY.
	7. AUDITORY SYSTEM	HEAR, LISTEN	RECEIVES MESSAGES FLEXIBLY WITHOUT MISSING THE STORIES OF OTHERS.
	8. VISUAL SYSTEM	SEE, WATCH	ACCURATE VISUAL PERCEPTION WITH RICH IMAGINATION AND ABILITY TO MAKE DISCOVERIES.

### Subjects and Methods

Seven of the 11 subjects were over 75 years old, while four ranged in age from 65 to 74. The cutoff score for musculoskeletal ambulation disorder (MAD), as assessed with the Kihon Checklist (KCL) [No.6-10] (Table 3), is three points or more (Satake, S., et al, 2016). Three of the 11 subjects had MAD (three points), while the other eight scored two points or less. Four of these eight displayed worsening musculoskeletal function.

Looking at the checklist items, eight of 11 participants replied “Yes” to the statement, “I cannot climb the stairs without holding the railings or the walls.” Four subjects concurred with the statement, “I worry about falling.” Three responded affirmatively to “I am not able to get up from a chair without help,” and one person agreed with these statements: “I cannot walk for 15 minutes continuously” and “I have fallen during the past year.”

**Table 3.** The KCL consists of 25 yes/no items divided into seven categories: physical strength, nutrition, eating, socialization, memory, mood, and lifestyle (questions 1–20). Each category is rated on a pass (0) /fail (1) basis, and the sum of all indices ranges from 0 (no frailty) to 25 (severe frailty). A higher score indicates worse functioning.

Kihon Checklist

No.	Questions	Answer
1	Do you go out by bus or train by yourself?	<input type="checkbox"/> 0. YES <input type="checkbox"/> 1. NO
2	Do you go shopping to buy daily necessities by yourself?	<input type="checkbox"/> 0. YES <input type="checkbox"/> 1. NO
3	Do you manage your own deposits and savings at the bank?	<input type="checkbox"/> 0. YES <input type="checkbox"/> 1. NO
4	Do you sometimes visit your friends?	<input type="checkbox"/> 0. YES <input type="checkbox"/> 1. NO
5	Do you turn to your family or friends for advice?	<input type="checkbox"/> 0. YES <input type="checkbox"/> 1. NO
6	Do you normally climb stairs without using handrail or well for support?	<input type="checkbox"/> 0. YES <input type="checkbox"/> 1. NO
7	Do you normally stand up from a chair without any aids?	<input type="checkbox"/> 0. YES <input type="checkbox"/> 1. NO
8	Do you normally walk continuously for 15 minutes?	<input type="checkbox"/> 0. YES <input type="checkbox"/> 1. NO
9	Have you experienced a fall in the past year?	<input type="checkbox"/> 1. YES <input type="checkbox"/> 0. NO
10	Do you have a fear of falling while walking?	<input type="checkbox"/> 1. YES <input type="checkbox"/> 0. NO
11	Have you lost 2kg or more in the past 6 months?	<input type="checkbox"/> 1. YES <input type="checkbox"/> 0. NO
12	Height: cm, Weight: kg, BMI: kg/m <sup>2</sup> If BMI is less than 18.5, this item is	<input type="checkbox"/> 1. YES <input type="checkbox"/> 0. NO
13	Do you have any difficulties eating tough foods compared to 6 months ago?	<input type="checkbox"/> 1. YES <input type="checkbox"/> 0. NO
14	Have you choked on your tea or soup recently?	<input type="checkbox"/> 1. YES <input type="checkbox"/> 0. NO
15	Do you often experience having a dry mouth?	<input type="checkbox"/> 1. YES <input type="checkbox"/> 0. NO
16	Do you go out at least once a week?	<input type="checkbox"/> 0. YES <input type="checkbox"/> 1. NO
17	Do you go out less frequently compared to last year?	<input type="checkbox"/> 1. YES <input type="checkbox"/> 0. NO
18	Do your family or your friends point out your memory loss? e.g. “You ask the same question over and over again.”	<input type="checkbox"/> 1. YES <input type="checkbox"/> 0. NO
19	Do you make a call by looking up phone numbers?	<input type="checkbox"/> 0. YES <input type="checkbox"/> 1. NO
20	Do you find yourself not knowing today's date?	<input type="checkbox"/> 1. YES <input type="checkbox"/> 0. NO
21	In the last 2 weeks have you felt a lack of fulfillment in your daily life?	<input type="checkbox"/> 1. YES <input type="checkbox"/> 0. NO
22	In the last 2 weeks have you felt a lack of joy when doing the things you used to enjoy?	<input type="checkbox"/> 1. YES <input type="checkbox"/> 0. NO
23	In the last 2 weeks have you felt difficulty in doing what you could do easily before?	<input type="checkbox"/> 1. YES <input type="checkbox"/> 0. NO
24	In the last 2 weeks have you felt helpless?	<input type="checkbox"/> 1. YES <input type="checkbox"/> 0. NO
25	In the last 2 weeks have you felt tired without a reason?	<input type="checkbox"/> 1. YES <input type="checkbox"/> 0. NO

(Working Group on Frailty in JGS)

In this study, we employed the music fitness program designed at TFU, adjusting it for the situations of elderly people living in metropolitan areas. In designing a suitable program, we discussed the following two perspectives:

#### 1. Exercise instruction perspective

##### a) Moving from inactive to active living state

Every session of the main program included dumbbell exercises to move toward a more active state of life.

##### b) Instruction on lifestyle and habits

To encourage participants to review their lifestyles and habits, we held a lecture on the effects of dumbbell exercises and prevention of musculoskeletal ambulation disorder (locomotive syndrome).

c) Safety considerations

Sessions were conducted with the physical condition of the subjects in mind, for example, arranging chairs to prevent falls. After considering subjects' physical and mental condition, past medical history, and so on, we attempted to design exercise programs that would be reasonably challenging without putting the subjects at risk.

2. Recreational perspective

a) Programs that can lead to self-affirmation

To keep participants motivated, they were aided in choosing programs that led to their own pleasure and satisfaction.

b) Theme-based sessions

By setting the themes of classroom sessions according to the four seasons and other occasions, we hoped that the lessons and activities would be more memorable through association with these well-known days and seasons.

c) Utilization of the CSS method

One method of supporting recreation is the “Catch,” “Spotlight,” “Spray” (CSS) method (National Recreation Association in Japan, 2007), in which leaders/supporters facilitate and utilize interaction among participants. Specifically, the session leader spots and “captures” a target response (Catch), gathers the attention of other subjects (Spotlight), and shares it with the group as a whole (Spray). In this study too, keeping the CSS method in mind, we tried to promote communication by asking participants about songs and encouraging them to remember the eras in which they were released.



Figure 3. Images from music fitness sessions.

“One-line diary” for brain function activation

As part of a cheerful group recreation program in the metropolitan area, a one-line diary, aimed at encouraging brain activation, was introduced. Every day, participants filled out the diary according to the weekly themes printed in the diary we provided. We set familiar themes so that anyone could join in. Themes were also set to create opportunities to go outdoors. Writing on a different theme each week could have seemed mentally burdensome to some participants, so at the end of each session, the instructor entered a comment in each diary to help participants stay motivated.

Results

1. Changes in brain address activity

The Mann-Whitney U test was used to compare before- and after-exercise brain address activity (0 to 100) for each cerebral address: the whole brain, left brain, right brain, frontal lobe, and temporal/parietal/occipital lobe sections. Figure 4 (below) shows pre-exercise brain address activity (0 to 100) in orange and post-exercise activity in blue.

Considering all brain segments, pre-scores averaged  $62.4 \pm 4.7$  and post-scores averaged  $63.5 \pm 4.4$ , showing a maintenance of brain address activity. Comparison of pre- and post-exercise activity for three brain addresses—the thinking system (left brain), auditory system, and exercise system (right brain)—showed significant improvement, as shown in Fig. 4. Brain address activity increased by 11.8% in the thinking system, 11.7% in the right brain motor system, and 12.7% in the auditory system.

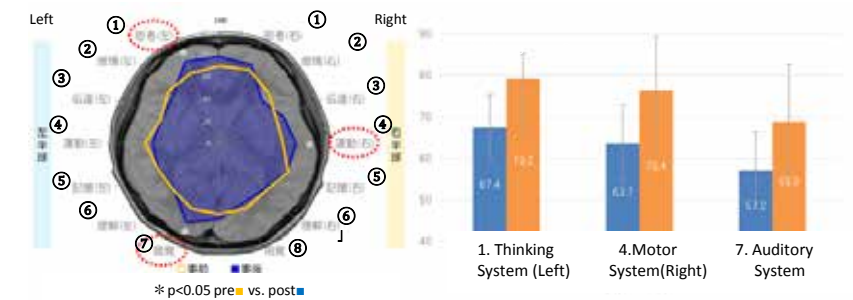
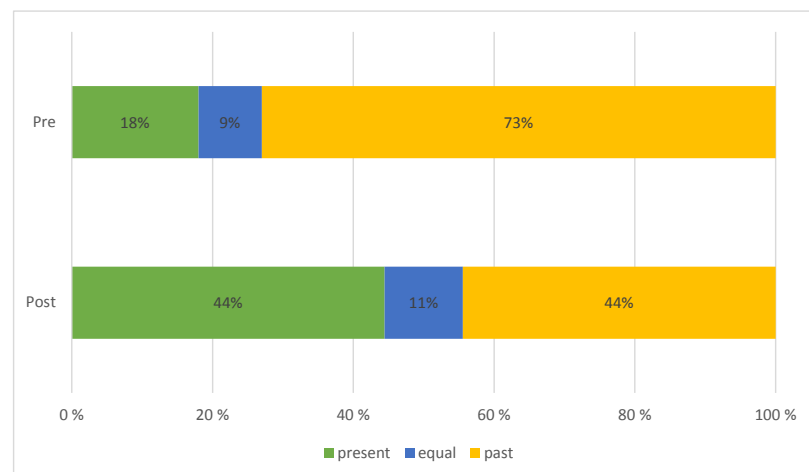


Figure 4. Changes in brain activity assessed by SRI Brain Address diagnosis.

2. Changes in self-image: past vs. present

Subjective evaluations of self-image for the past and present were obtained from questionnaires completed by participants both pre- and post-exercise. Questionnaire results were used to assess whether subjects evaluated their past or present selves more highly, and the relative proportions were compared pre- and post-exercise. Fisher's test was used to assess the significance of any changes.

As shown in Fig. 5, in the pre-exercise evaluation, 73% of the participants appreciated their past selves more highly, while only 18% rated their present selves more highly. In the post-exercise evaluation, the proportion who valued their past selves more highly decreased to 44%, and the number of people who more highly appreciated their present selves increased to 44%. The changes, however, are not statistically significant.



**Figure 5.** Positive self-image for present and past

## Summary of brain function measurement

- Participation in GENKI juku yielded a post-treatment, total average brain address activity that was  $103\% \pm 4\%$  of the pre-treatment level.
- Significantly improved brain address activity rates were observed in the left-brain thinking system ( $122 \pm 21\%$ ), auditory system ( $117 \pm 15\%$ ), and right-brain motor system ( $121 \pm 22\%$ ).
- Associated intellectual activities, such as activity-related speech and diary writing, may have been effective in improving the left-brain thinking system.
- It is highly likely that activities related to the content of Everybody's GENKI juku and communication during GENKI juku activities were directly involved in improving the auditory system of the brain.
- Improvement in the right-brain movement system is thought to be related to the attention paid during exercise activities to the left half of the body, which is relatively unused by many senior citizens.

We believe the observed improvements in past self-image are related to impressions of memories that were reconstructed through participation in GENKI juku activities. The opportunity to touch upon the past is very important, and we speculate that singing songs from their youths, remembering their past selves, and maintaining their diaries were helpful in this regard. The activities may also have been involved in improving the auditory and thinking systems. Fun characters and eye-catching movies stimulate the visual as well as auditory systems.

From these findings, it can be said that the music fitness class was an effective program for these senior, metropolitan-area residents. We hope to conduct future research on the effectiveness of a group recreation program led by residents themselves using the DK Elder System.

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Oral health care is usually established as a hygiene habit from childhood with the assistance of parents, and cleaning skills and knowledge develop with age. Disabled individuals and recipients of long-term care often receive special assistance to compensate for inadequate self-care. Even for elderly individuals with dementia, preventive oral health care is necessary at all stages. In a narrow sense, oral health care refers to oral cleaning and dental treatment, but in a broader sense, it includes functional training on proper diet (nutrition improvement), promotion of saliva production, prevention of aspiration, prevention of dysphagia, oral rehabilitation, etc. The ultimate goal of oral health care is to maintain and improve ADL (activities of daily living) and QOL (quality of life). In the field of geriatric nursing care in Japan, oral health care was often practiced in the narrow sense of keeping the oral cavity clean, and fell in the “preservation” category along with bathing and hair washing. In recent years, however, recognition of the importance of the broader sense is increasing.

### Effects of oral health care

The primary function of oral care is preventing dental caries and periodontal disease. Dental caries occurs when oral bacteria, such as *Streptococcus mutans*, proliferate and produce extracellular polysaccharides (dental plaque) which adhere to the tooth surface and metabolise saccharides, thus producing acids. These acids cause decalcification of teeth leading to dental caries. Dental caries causes collapse of the tooth structure and inflammation of the dental pulp, eventually resulting in tooth loss and difficulty in chewing. Periodontal disease is a general term for diseases occurring in the gums. There are more than 10 types of bacteria that cause periodontal disease, such as *Porphyromonas gingivalis*, *Tannerella forsythensis*, and *Treponema denticola*. Normally, the periodontal pocket, at the boundary between the tooth and gum (gingiva), has a depth of 1-2 mm. However, gingival inflammation caused by bacteria in plaque destroys periodontal tissue and deepens the periodontal pocket. Mainly anaerobic pathogenic bacteria grow in the periodontal pocket—sustaining inflammation, absorbing alveolar bone, and causing tooth loosening and loss.

Daily preventive dental care is basically the mechanical removal of food particles, bacteria, and plaque with a toothbrush and/or various other oral cleaning tools. In most cases, the correct use of these tools, including frequency and timing, is more important than the particular tool used. For example, brushing once-a-day with an excellent toothbrush is not sufficient. Thus, education and technical guidance for correcting poor oral self-care is necessary, and assistance should be adjusted for the oral condition and needs of the client. For these reasons, beyond daily self-care, regular preventive guidance and calculus removal by dental hygienists or dentists are critical. Generally, once every six months to a year is sufficient, but inadequate or inappropriate self-care may dictate a shorter interval. As mentioned above, elderly individuals in nursing care may require help with daily oral care, as well. The oral hygiene of bedridden elderly often suffers, and if this continues, it may lead to worsening caries and periodontal disease, as well as various systemic diseases, such as aspiration pneumonia, diabetes, and cardiovascular disease.

Yoshihiko Watanabe

## THE NEED FOR ORAL HEALTH CARE FOR THE ELDERLY AND A TRIAL OF A KARAOKE-BASED ORAL FUNCTION IMPROVEMENT PROGRAM FOR SENIORS

### Definition and importance of oral health care

The oral cavity hosts various functions such as chewing, speaking and breathing. To maintain and improve function and prevent disease (e.g., local and systemic diseases caused by bacteria and viruses) daily cleaning is necessary. In Finland, xylitol's effects were revealed by the Turku Sugar Studies<sup>1)</sup> and subsequent epidemiological studies. Research aimed at developing xylitol-based oral care products was then conducted, and products for people of all ages are now available. In Japan, products with sugar alcohols, including xylitol, are also widely used as candy, chewing gum, and the like, and some have been certified by the Consumer Affairs Agency as “foods for specified health uses.” However, even regular consumption of sugar alcohols is insufficient for prevention of caries and periodontal diseases. The Finnish Dental Association recommends brushing with a fluoride toothpaste at least twice a day. This is necessary because of the large amounts of sugars and carbohydrates in modern diets, and the many sticky saccharide products that persist in the oral cavity. Promoting the secretion of saliva, which contains a digestive enzyme, and stimulating the tongue and cheeks are also helpful. Even elderly individuals who have lost all of their teeth, must care for the oral cavity to maintain hygiene and oral function.



Yoneyama et al.<sup>2</sup> conducted a two-year epidemiological study with 336 senior citizens in 11 nursing homes, randomly divided into a special oral care group and a control group. Those receiving professional oral care (after-meal brushing by a caregiver or a nurse, rinsing with 1% povidone-iodine, and weekly professional teeth cleaning by a dentist or dental hygienist) experienced significantly lower occurrence of fever, pneumonia and death due to pneumonia. The link with pneumonia is believed to be related to subclinical aspiration of oral bacteria resulting in aspiration pneumonia.

Regarding the link with diabetes, Kiran et al.<sup>3</sup> randomly assigned 44 patients with type 2 diabetes to a non-surgical, periodontal treatment group and a non-treatment group. After a period of treatment, glycated hemoglobin levels were significantly better in the treatment group, and there was significant improvement in parameters of periodontal disease (plaque index, area of gingivitis, depth of the periodontal pocket, and bleeding with pocket probing); compared with no change in the non-treatment group.

Regarding the association with cardiovascular disease, Khader et al.<sup>4</sup> conducted a meta-analysis and found that periodontal disease patients were as 1.15 times more likely (95% CI: 1.06-1.25,  $p = 0.001$ ) to suffer from coronary artery disease compared with healthy subjects. Mortality due to coronary artery disease was 1.21 times higher, but the result was not statistically significant (95% CI: 0.95-1.52,  $p = 0.108$ ). Janket et al.<sup>5</sup> also found that individuals with periodontal disease were 1.19 times more likely to experience cardiovascular disease (95% CI: 1.08-1.32). In addition, in a systematic review and meta-analysis by Freitas et al.<sup>6</sup>, they concluded that non-surgical periodontal disease treatment reduces blood CRP (a marker of inflammation).

Paganini-Hill et al.<sup>7</sup> examined mortality risk factors in a cohort study of 5,611 elderly people. Not brushing teeth before bed introduced a risk factor of 20-35% compared with those who brushed every day. Not using dental floss yielded a risk factor of 30% compared to those who flossed daily. While not visiting a dental office for over a year was associated with a risk factor of 30-50% compared to those who visited more than once a year. Compared to those with more than 20 teeth, edentulous (toothless) individuals (even those using dentures) had a 30% higher risk of death. They concluded that oral health care not only maintains good tooth function, but also contributes to longevity.

In addition, Ikebe<sup>8</sup> observed that the quality of occlusion (alignment of the teeth when the jaws are closed) and chewing contribute to health and longevity. Examining human cohort studies, he concluded that the number of remaining teeth and longevity are related. The connection may involve changes in nutritional intake due to periodontal disease and decreased oral function. In particular, tooth loss can result in insufficient consumption of vegetables, which is thought to increase the incidence of heart disease and cerebrovascular disease.

As described above, oral health care not only improves oral cavity hygiene and functional maintenance, but is also an important factor in general health maintenance and prevention of systemic diseases.

## Relationship between oral health and dementia

The relationship between the number of teeth and/or oral cavity hygiene and dementia has been demonstrated by several recent studies. Chen et al.<sup>9</sup> studied 902 elderly residents from the same facility: 199 with no cognitive dysfunction (non-disabled group); 177 with decreased cognitive function, but no dementia (disability group); and 501 with dementia (dementia group). Individuals in the disability and dementia groups had, on average, six teeth with caries or residual roots caused by caries. This was 4.7 times higher than the non-disabled group. In addition, according to a cohort study of 5,468 individuals by Paganini-Hill et al.<sup>10</sup>, men missing many teeth and needing dentures to chew had a risk of dementia 91% higher than those with over 10 upper teeth and six lower teeth and reasonable chewing function. Similar tendencies were seen for women, although the difference was not statistically significant. They also reported that individuals who did not brush their teeth daily had a 22-65% higher risk of dementia than those who brushed after each meal—three times a day. In addition, Yamamoto et al.<sup>11</sup> conducted a 4-year, prospective cohort study of 4,425 people—age 65 and older—on their number of teeth, use of dentures, chewing ability, dental visits, and oral cleaning status. They found that regardless of age, lifestyle or medical conditions requiring treatment, the risk of dementia was 1.85 times (95% CI: 1.04-3.31,  $p = 0.04$ ) higher for those with few or no teeth and no denture use, and 1.44 times (95% CI: 1.04-2.01,  $p = 0.03$ ) higher for those not making regular dental visits. These studies suggest that a decrease in cognitive function exacerbates oral condition, and that long-term, insufficient oral hygiene practices and passive attitudes towards dental treatment may contribute to the development of dementia. Related negative factors contributing to dementia include chronic inflammatory state of periodontal tissue, malnutrition due to lower oral function. On the other hand, positive factors seen as preventive include movement of mouth (e.g., chewing), which stimulates the brain, and a balanced diet. We thus see that oral health care is an important way to lower risk factors for dementia.

## The role of dental hygienists in nursing facilities

Tohoku Fukushi University (TFU) deploys dental hygienists to related nursing facilities to promote oral health care. Initially, the hygienists directly provided care for elderly residents, but they now cooperate with a range of professionals—from within and without the facilities—in providing care. Daily oral cleaning is carried out either by the residents themselves or the nursing staff, while dental hygienists assess oral function and hygiene, and individually teach residents how to maintain oral health. Dental hygienists also examine the oral condition of newly admitted

residents and, when necessary, arrange (with the resident's or family's permission) for dentists to come in and provide treatment. The dental hygienists thus play a key role in the oral health care of residents and in their daily lives and overall health. For elderly clients using daycare services, there is also an oral health care program led by hygienists, providing preventative care, particularly care aimed at preventing or delaying dementia.

Below, we discuss the oral health care of patients suffering from dementia and present an experiment using karaoke as part of an oral function improvement and dementia prevention program.

### Issues and measures in the oral health care of patients suffering from dementia

Sumi et al.<sup>12</sup> gave oral exams to 10 patients suffering from a mild form of Alzheimer's-type dementia and provided guidance to them and their caregivers on oral hygiene. They then noted any subsequent changes in oral condition and the degree of understanding each patient showed of the oral cleaning process. They did not see a significant improvement in either plaque index or gingivitis index. There was also no change in the level of understanding displayed by patients. For patients suffering from dementia, even limited oral self-care is problematic. So in addition to creating a habit of oral self-care during middle age, before dementia sets in, Sumi et al. concluded that oral-care support from the initial stages of dementia—by both family members and dental professionals—is necessary.

Ideally, the primary caregiver supports a patient in maintaining oral self-care habits formed from a younger age. However, in many cases these self-care habits are inadequate, and various factors can add up to impede effective self-care. For example, deteriorating motor function of the fingers, upper limbs, head, and neck can make removing dentures or using a toothbrush difficult; poor swallowing function makes it difficult to gargle without choking; and reduced walking ability can prevent one from getting to the sink in the first place. Furthermore, it is not uncommon for patients suffering from dementia to refuse care—one manifestation of their behavioral/psychological symptoms. In particular, patients may strongly resist being touched in the delicate mouth region and may reflexively bite down on anything entering the oral cavity. Providing oral care or dental treatment may also prove difficult due to a patient's confusion and inability to understand the necessity of the procedure or because inability to express their feelings results in hurt pride.

Because dementia patients present such a diverse range of symptoms and behaviors, caregivers must have a basic knowledge of oral health care and cooperate with dental professionals in creating practical, suitable care plans on a patient-by-patient basis. In particular, building trust on a personal level is critical for encouraging dementia patients to open their mouths and submit to oral care. From a practical perspective, helpful tools and strategies include bite blocks, light stimulation of the K-point

(mucous membrane behind the last molar) and desensitization therapy (systematically progressing from the perioral area, around the mouth (e.g., jaw, cheeks), to the more sensitive lips, teeth and gums). Upon restraining the head and securing a stance allowing the care- or treatment giver to deal with sudden movements, it is important to slowly approach the mouth in a way that causes as little anxiety and pain as possible. In addition, as much as possible, oral health care should become a regular part of a patient's schedule, carried out at the same time by the same person in the same way each day.

### Trial of a karaoke-based oral function improvement program

In this volume, Kawamura reports on a TFU initiative aimed at improving health, providing preventative care, and building community through karaoke. One component of this initiative has been the development of interactive content focused on improving oral function. Intervention studies to verify its effect are being carried out<sup>13 14</sup>). Karaoke is familiar to many as a form of entertainment, and singing is an effective way to exercise the muscles in the perioral region, muscles related to breathing, and muscles that generate facial expressions, etc. Singing may be a kind of “natural” oral function training with a rehabilitative effect. It also promotes saliva secretion, which keeps the oral cavity clean and helps maintain swallowing function through induction of the swallowing reflex. However, it may also be that singing alone is not sufficient, and that purposeful exercise, and the adjustment of that exercise through sensory feedback, is also required to enhance this kinetic effect. Therefore, our university developed an “oral exercise routine” for a video karaoke system. On the video, performers move their heads, necks, and mouths in time to music. Clients imitate these movements, which are all related to oral function. The program takes just a few minutes and is structured to allow many people to participate at once. It is an integrated part of a larger, comprehensive preventative care and exercise program—all hosted by the karaoke system. To test the effect of this “oral exercise routine,” we held preventative care classes for elderly participants and monitored its impact.

### Method

Weekly, hour-long preventative care classes were held in four locations—Sendan no Oka (nursing care facility in Sendai) (n=5), Genkijuku (members-only health club in Sendai) (n=9), Nakano Genkijuku (members-only health club in Tokyo) (n=11), and Sendan no Yakata (nursing care facility in Sendai) (n=11)—for a period of 10-12 weeks, depending on location. Class dates varied, but all were completed between April 1st, 2012 and March 31st, 2014. An examination was held during the first class, the final class, and 1-2 months after the final class to measure effects. In each lesson, the session leader used program content (preventative care content, song content, and game content) installed on a “FREE DAM” DK Elder System karaoke machine, as well as his/her own, original singing and exercising activities. The assessment criteria for

the examinations is described in Table 1. Using an examination questionnaire, data in four categories were collected, then scored and compared. Additionally, swallowing function was measured, as shown in Table 2, using RSST (Repetitive Saliva Swallowing Tests) and oral diadochokinesis tests. These measurements were then graded and added to the indicators of Table 1. For the oral diadochokinesis measurements, we used an oral function measurement device (Kenko-Kun T.K.K.350) from Takei Scientific Instruments Co., Ltd.

**Table 1.** Indicators of oral function from examination questionnaire

TEST	QUESTION	INDEX		
		10 POINTS	5 POINTS	0 POINTS
PERIORAL MUSCLES	HOW WIDELY CAN THE PATIENT'S MOUTH OPEN?	CAN INSERT 3 FINGERS (OPENS APPROX. 4CM OR MORE).	CAN INSERT 2-3 FINGERS (OPENS APPROX. 2.5 - 4 CM).	CAN INSERT LESS THAN 2 FINGERS (OPENS APPROX. 2.5 CM OR LESS).
	CAN THE PATIENT PUFF UP BOTH CHEEKS?	CAN PUFF UP BOTH CHEEKS WELL.	CAN ONLY PUFF UP ONE CHEEK WELL.	CANNOT PUFF UP CHEEKS.
CHEWING ABILITY	CAN THE PATIENT CHEW SUDAKO (OCTOPUS) OR SURUME (DRIED SQUID)?	CAN CHEW NORMALLY.	CAN CHEW IF CUT INTO SMALLER PIECES.	CANNOT CHEW.
	DOES THE PATIENT USE FALSE TEETH (REMOVABLE DENTURES)?	PATIENT HAS A RELATIVELY FULL SET OF TEETH AND DOES NOT REQUIRE DENTURES.	PATIENT IS MISSING SOME TEETH AND DOES NOT USE DENTURES.	PATIENT USES DENTURES.
SWALLOWING FUNCTION	DOES THE PATIENT EVER FIND IT DIFFICULT TO SWALLOW FOOD?	NO.	SOMETIMES.	OFTEN.
ORAL CLEANLINESS	DOES THE PATIENT BECOME BOTHERED BY DRYNESS IN THE MOUTH?	NO.	SOMETIMES.	OFTEN.
	IS THE PATIENT RECEIVING REGULAR DENTAL TREATMENT?	MORE THAN ONCE PER YEAR.	AT IRREGULAR INTERVALS (LESS THAN ONCE PER YEAR).	PATIENT ONLY RECEIVES TREATMENT WHEN SYMPTOMS PRESENT.

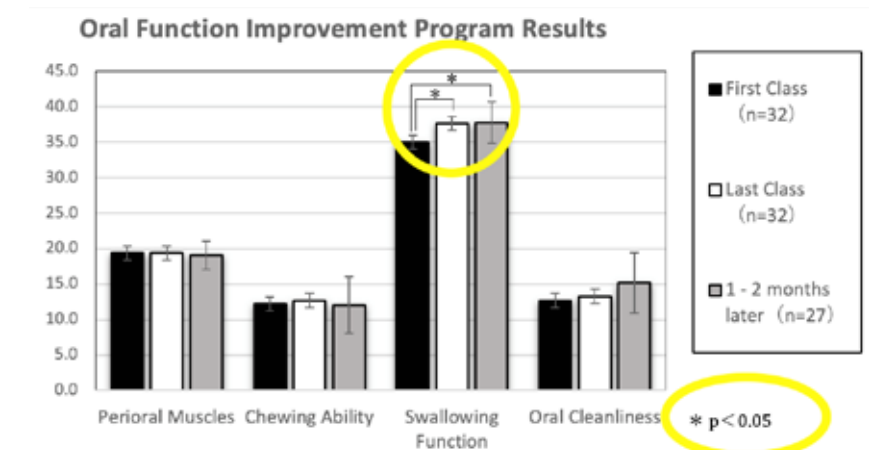
**Table 2.** Indicators of measured oral function

TEST	PROBLEM	INDEX		
		10 POINTS	5 POINTS	0 POINTS
RSST	HOW MANY TIMES CAN THE PATIENT SWALLOW SALIVA IN 30 SECONDS?	3 TIMES OR MORE.	1-2 TIMES.	0 TIMES.
ORAL DIADOCHOKINESIS TEST	HOW MANY TIMES CAN THE PATIENT SAY "TA" ("TA TA.TA...") IN 30 SECONDS?	24 TIMES OR MORE.	19-23 TIMES.	18 TIMES OR LESS.
	HOW MANY TIMES CAN THE PATIENT SAY "KA" ("KA KA KA...") IN 30 SECONDS?	22 TIMES OR MORE.	16 - 21 TIMES.	15 TIMES OR LESS.

## Results

We received results from the first and last classes for 32 participants. We also ran the same assessment 1-2 months after classes had concluded to assess the durability of the effect, and received data from 27 participants.

Although there were no significant differences in perioral muscle condition, chewing ability, or oral cleanliness between the first class, last class, or 1-2 months later, a significant improvement was found in swallowing function from the first class to the last class, and it remained 1-2 months later (Figure 1).



**Figure 1.** Results of the program

## Discussions

Our karaoke-based oral function improvement program was employed with elderly participants as part of the preventative care activities at several facilities. The “oral exercise routine” allowed participants to easily make oral function-related movements by mimicking on-screen performers moving in time to music. Among the functional categories assessed, we found were that the swallowing function index showed a significant improvement. Movements of the head, neck, and mouth performed by the participants may have had a rehabilitative effect on motor skills of the muscles related to chewing and swallowing—thus yielding the observed improvement in swallowing function. This improvement also endured for at least 1-2 months after program end. Swallowing function is important for the elderly, as it helps to maintain good nutrition and prevent aspiration pneumonia. Singing also stimulates saliva secretion, which promotes cleanliness in the mouth and smooths swallowing. These factors indicate that an oral function improvement program involving karaoke singing can have a positive effect on preventative care and disease prevention.

As the main focus of this project was developing and making available the program, there is considerable room for improvement in regard to the design and accuracy of effect measurements. We must consider whether the grading system used to assign index values was thorough enough to capture minute changes stemming from the oral exercise routine and consider the weighting of question types and indexes. Furthermore, it is possible that differences in the program as delivered at each facility (group atmosphere, leader performance) also affected the results. Cognitive function was also not measured. The target group for this research was healthy elderly individuals, and even if cognitive ability had been measured, it would have been difficult to see any changes over such a short time span.

Anecdotally, there were a couple of other positive outcomes. Implementation of this kind of enjoyable, karaoke-based oral health program can become an opportunity for social participation and connection. Those in charge of the classes reported that each time a class was held, the participants became more familiar with each other and communication became more lively. Also, interestingly, we learned that this program led several participants to subsequently obtain dental treatment.

As described in the former 3 sections, the maintenance and improvement of oral function is extremely important in relation to the function of the entire body. Although it is not yet clear what effect, if any, programs such as the one described here may have on the prevention of dementia, this study does suggest that the program led to improvement in swallowing function, and that such activities have potential for facilitating social connection and motivation to receive dental treatment.

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PART 3  
CULTURE AND  
LIVING LABS

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## FINNISH HERITAGE AS A PROVIDER OF HEALTHY AGEING FOR ELDERLY FINNISH AMERICANS

The paper explores the significance of the Finnish heritage for the Finnish American elderly's well-being through life-narrative interviews of eight Finnish American elderly living in rural Upper Peninsula, Michigan, USA. The study found that so-called 'heritage bound place' acts as a main source for providing well-being for the Finnish American elderly. The Finnish heritage is strongly rooted in place of the upbringing. It manifests itself in the importance of the geographical surroundings, in the importance of nature, in the ability to converse in Finnish and in the maintenance of Finnish American culture in social get-togethers and in Finnish building and handicraft traditions and artefacts. The 'heritage bound place' promotes well-being since it keeps the past alive and offers a meaning of self. The study highlights that the cultural heritage is best lived in a surrounding of its origin, enabling the elderly in question to participate in activities that cherish and are rooted in their cultural heritage.

### Introduction

The history of emigration from Finland to America during the late 19th and early 20th centuries conceals a variety of reasons as to why emigrant Finns had chosen to leave their precious homeland. One of the biggest reasons for emigration was that

the homeland could not provide bread and butter for everyone. (Kaunonen 2009; Taramaa 2007.) In the 1860s, the agricultural Finland experienced a famine due to a series of crop failures. Since Finland heavily depended on the land, these blights causing crop failure, had long-lasting and devastating effects on society both on the collective and individual level. During the following decades, many Finns from the western and northern agricultural provinces saw life in America or in the southern urban centres of Finland as the only remedy to their situation. (Kaunonen 2009.)

Other reasons for emigration were social, political and religious issues. For example, some left to avoid conscription into the Russian army during the years of Russification in Finland, and to others, America provided a chance to start over and begin a new life. Relatives and friends who had already emigrated to America acted as an example and as a social network for those who pondered the possibility of leaving the homeland for better future prospects. (Kaunonen 2009; Taramaa 2007.) Between 1865 and 1914, roughly 308,000 emigrants departed Finland for America (Kaunonen 2009). Despite the somewhat large amount of the emigrated Finns in America, Finnish Americans are a relatively small ethnic group. As Taramaa (2007) points out, of the total number of immigrants to the United States up to 1920, Finns made up less than one per cent. At the time of the heydays of the immigration period of the late 19th and early 20th century, they settled in highly localised, often rural areas limited to a relatively few states in the northern areas of the United States. In particular, they populated distant states and territories, the workforce was in demand especially in mines, prairie farms, railroad building and in industry. (Taramaa 2007, 48.) What is noteworthy is that, even today, the Finnish American culture and heritage is preserved well in Upper Peninsula, Michigan. For example when entering the city of Hancock, one notices the vestiges of a significant Finnish-American presence. The street signs are bilingual, the Finnish traditional cuisine/food can be found in the stores and former Suomi College, established by the immigrant Finns continue to promote and preserve Finnish American culture and heritage as Finlandia University. (Kurtti 2002; Taramaa 2007.)

It can be argued, that in the early years of the twentieth century, Finnish Americans lived in a culture that was basically Finnish. So to say, Finnish immigrants wanted to recreate the same way of life for themselves as they had left behind in Finland. (Taramaa 2007, 81.) As Aili Jarvenpa (1992) writes: "With two cultures is exactly what we, the children of Finnish immigrants had to contend, unlike other generations. It wasn't always easy, but we had no choice. In our homes, our churches, our Finn halls, our co-op stores, and in the homes of Finnish friends and relatives, we were surrounded daily by our Finnish culture, which was comfortable and familiar." (Jarvenpa 1992, xi.) The first-generation Finns did not assimilate into the mainstream although they adapted themselves to the new conditions. The assimilation theories and melting pot theories were not appropriate theories to describe the assimilation of Finnish immigrants since in some "Finnish" areas there were very few Americans to melt with. Almost all the inhabitants were immigrants. Finns were a relatively small group with their difficult language and awkward



customs. Many were 'clannish' and established their own organisations to help their people to manage in the new country. Many were 'open to American values' but they had a strong desire to preserve their own values. (Taramaa 2007, 58.)

Like all other ethnic groups in America, both the first-generation Finns and their second-generation American born descendants preserved the Finnish language and relied on their ethnic identity as a mark of who they were and where they came from. As time passed, the American influence became more balanced with the ethnic background. (Taramaa 2007.) As Jarvenpa (1992) states, the children of immigrants, not just of Finnish immigrants but of many other countries as well, were often called the "go-betweens" because they had to live much of their childhood (and even up to adulthood) between two cultures (Jarvenpa 1992, xi). As Taramaa (2007) points out in quoting Virtanen (1999) it should be noted that ethnicity cannot mean the same today as it did for the first-generation immigrants, whose identity was largely dependent upon the sense of group identity. For example, the lingual assimilation among Finns occurred in a synchronised fashion; that is, the meaning of Finnish language weakened to the same degree that the importance of English language strengthened. Yet, in smaller communities the Finnish language continued to be used longer than in larger cities. No matter how blended cultural identities are, the number of cognitive scientists argue, that some values, manners, and beliefs – as well as certain cultural characteristics people have – stay with them a long time, and sometimes their whole lives. (Taramaa 2007, 56.)

## Methodological aspects of the research

The aim of the research is to describe how the Finnish American elderly living in rural Michigan describe the meaning of their Finnish heritage for their well-being. The research will provide important information about the issue of growing old as Finnish Americans. Western societies are ageing rapidly and there is a need to understand the phenomenon in order to provide societal means to support active and socially sustainable ageing.

I interviewed 8 elderly Finnish Americans during the summer of 2017 whose current residences are in rural and small town locations in Upper Peninsula, Michigan. Of the eight interviewees, 5 were so-called long-term rural/small town residents and 3 were return migrants who had lived their childhood in the Upper Peninsula, Michigan but had lived elsewhere during their working life and returned to the UP after retiring. Four of these were living in the localities in which they had grown up, and four in the counties or nearby counties they had grown up in. Three were females and five were male. There were two couples who were interviewed. Six of the interviewed were married, one was a widow and one had remarried in recent years after widowhood. Seven participants were in their 70s and the oldest one had just turned 90. All the informants had children and most of them also had grandchildren and some of them had great-grandchildren. The interviewees were either second generation or third generation Finnish Americans, i.e. either their parent(s) or grandparent(s) had emigrated from Finland to America.

The interview setting was designed to enable participants to speak openly about their lives and to collect information about the Finnish heritage's meaning for their well-being. The interview was conducted in the form of life-narrative interviews. The life-narrative method makes it possible to reflect and construct events of life, memories and thoughts. (Ní Laoire 2007.) The interviews lasted between 45 and 81 minutes. They focused on childhood, adulthood and life after retirement. Each participant was also asked to tell a story of their choice relating to their lives. The thematic analysis was conducted to identify common themes through consecutive stages. First, the audio-recordings were listened to carefully. Following that, the parts of the audio-recordings that were not relevant for the research topic were eliminated from the transcription. Next, after carefully reading the transcripts, the researcher identified the central themes that emerged from the material. This paper will concentrate on describing the core theme, namely the significance of a heritage bound place for Finnish American elderly's well-being. The results of the theme will be discussed in relation to research findings of recent research on the matter.

All of the interviewed had grown up in an environment where Finnish language was spoken to them either by parent(s) or grandparent(s). If the parent(s) spoke Finnish at home and the milieu was Finnish American, it was common that a child could not speak English when he/she went to school. As one of the interviewee told:

*"And I did not know any English when I started school. It was fortunate that my first grade teacher was my future sister-in-law. So I could ask her "Missä hyysikkä on?" [where is the toilet]. And I did not know any English when I started school and that was true of most of the class."*

What should be noted here is that the inability to master the English language did not inhibit living a full life inside the Finnish American milieu as the prevalent language was Finnish at home and in social gatherings as was the case in most times in the immigrant milieus of Upper Peninsula, Michigan. As one of the interviewee describes the lively social life of this childhood:

*"I remember Juhannus [Mid-Summer Eve] way back, we visited and everybody spoke Finnish, there was no English, nobody spoke English when I was young and rippikoulu [confirmation school], we even had in Finnish, no that was not rippikoulu [confirmation school], but kesäkoulu [summer school], but rippikoulu [confirmation school] was in English."*

As Donald G. Wirtanen (1992) describes: "The immigrants from Finland at the turn of the century came to work and to make a home in what was often an unfriendly environment. They made life bearable by continuing the heritage which they brought with them. They and their children developed a subculture within American society. This was possible only in that time period; it was unique." (Wirtanen 1992, 49.) As Korkeasaari and Roinila (2005) point out, the living environment is vital in preserving a cultural identity.

When entering into adulthood, the social circles widened and the American influence became stronger. The spouses of Finnish Americans were not always of

Finnish descendants and the cultural heritage did not transfer to the children to the same extent as had been the case with the second generation of Finnish Americans. So to say, when entering into adulthood, the social contacts with Finnish American peers weakened to the same degree as the social contacts with members of other ethnic groups increased and strengthened. The change was also boosted by the fact that quite many had to look for work outside of the familiar milieu. As one interviewee describes:

*“We just grew up as X gang, and stayed together until we got married and then the gang split up. Our leader, he went to college, one went to military service. The rest of us, we stayed here but were not really close, we are still nice to each other when we meet.”*

The adult years of the interviewed were constituted of working life and raising children. Many of the interviewed have lived in different part of the US and worked in varied professions and workplaces. As one respondent stated:

*“I had a kind of exclusive experience in my early life going from one type of job to another.”*

In general, the strong working ethic is portrayed in many interviews. As Taramaa (2007) points out, the Lutheran work ethic symbols ‘Finnishness’ to many Finnish Americans and it is one of the key values that are seen as important to pass on to children. Those interviewed also mentioned a respect for education, Finnish culture, respect for other people and modesty as values that they expressed as important values they hoped their children possess as Finnish values.

## Research findings – A place of belonging as a provider of well-being

In the following, I will describe how the meaning of Finnish heritage is strongly rooted in a place and how a so-called ‘heritage bound place’ acts as a main source of providing well-being for the Finnish American elderly living in rural Michigan. As Winterton & Warburton (2012) argue, there is a growing body of evidence supporting the role of a place in healthy ageing. Moreover, the significance of a place grows for people as they age due to increased reflection and reminiscence. Relationships with a place can promote well-being, keep the past alive, offer constancy, meaning, control and security in times of change. A place can maintain and provide a sense of competence and independence and maintain positive self-image and identity. Thus, places provide a framework within which identity is constructed and maintained. It is the perception of being ‘at home’, where a place is an extension of oneself. In short, who you are is related to where you are and where you belong. (Winterton & Warburton 2012, 330.)

Retirement changes a person’s position in society. According to disengagement theory, retirement is a gradual withdrawal from society and working life of a retiree from their previous roles and relationships. Activity theory in its part suggests that

new activities replace work activities, and continuity theory views the retirement transition as the continuity of lifestyles and core values. It is essential to acknowledge that the retirement process and its outcomes are an increasingly individualised experience which is influenced by multiple factors, i.e. family circumstances, health and institutional and social contexts. (Principi et al. 2018.) As Glasgow and Brown (2012) point out, there are a growing number of older people who are living longer and are healthier than earlier generations. Thus, with greater affluence and longer lives, the retirement years offer scope for expanded opportunities for a new, active and positive phase of life (Principi et al. 2018).

All the interviewed emphasised the importance of their social and geographical environment of their upbringing for their sense of well-being in older age. They described the distinctive characteristics of their environment, such as nature’s meaning for their well-being. As four of those interviewed stated:

*“And to live here, you get to enjoy all the four seasons, which I do. Being active in all four seasons. It is just perfect.”*

*“And you cannot find more beautiful place because we have the Great Lake Superior, we have all kinds of small lakes and the beauty of the trees.”*

*“And everybody say why don’t you go south in winter and I say no way, we like skiing and the snow and all that.”*

*“Great place to retire because there are lots of great facilities here. Winters are harsh, but I have a pick-up truck with a blower, so I am able to blow snow.”*

As Milbourne (2012) argues, nature plays an important role in shaping older people’s experiences of ageing in rural surroundings and according to Taramaa’s (2007) research, nature is one of the characteristics attributed to Finnish heritage among Finnish Americans. The scenic rural locations and surroundings foster pride in the area of belonging (Winterton & Warburton 2012). The ability to speak Finnish was seen as important for one’s sense of Finnish American identity and as a way of maintaining and cherishing Finnish heritage as well as a way of keeping the past alive. As two of those interviewed stated:

*“I am proud of the fact that I learned Finnish and I consider myself fairly fluent.”*

*“If you don’t use it, you will lose it. And the other one who is still alive, we just about always talk Finn. I mieltii [I think] in Finn, always when I am doing something. It’s [Finnish language] a world, it means everything. Suomalainen. [Finnish]”*

Out of the interviewed 8, there were four persons who could converse in Finnish. They conversed in Finnish with their siblings and friends. The inability to converse in Finnish did not prohibit the rest of those who were interviewed from feeling proud of the language and the heritage provided by it.

One of the central themes related to the significance of a place was that it made it possible to stay active with multiple and newly acquired roles. So to say, the



rural community enables the meaningful daily functioning of the elderly Finnish Americans of the study. The rural lifestyle caters to tasks and functions that are salient to the self, such as the enjoyment of doing handicrafts, i.e. Finnish loom weaving, building Finnish saunas, doing carpeting, playing musical instruments and enjoying community get-togethers. As two of those interviewed illustrate:

*“We like peace and quiet, I knew that I could have the workshop and plenty of room to build a sauna.”*

*“So I heard on the radio that Suomi College is going to have violin classes and one winter I took classes there for a year. So that was my formal violin training, but I try to play every day. Joskus on niin hätä ettei oo aikaa. [Sometimes I am so busy that I do not have the time] I play mostly Finnish songs.”*

As Silen (2008) points out, Finnish building traditions were one way of maintaining the cultural heritage of Finnish immigrants. Their log building traditions is an example of this. The Finnish immigrant homesteaders built the needed structures themselves by using the knowledge they had inherited from their fathers. In that manner the building traditions passed from one generation to another. (Silen 2008.) One of the central features of Finnishness among Finnish Americans is the Finnish sauna culture. The Finnish immigrants built saunas for their families and there were also public saunas in the cities with sizable Finnish populations. Today, the sauna is a sign of being a Finn and it remains a source of ethnic pride among Finnish Americans. Nowadays the Lake Superior region is known as a centre of North America’s “sauna belt”. (Nordskog & Hautala 2010; Alanen 2010.) In the interviews, the importance of sauna culture is mentioned as a source of ethnic pride when the sauna is built according to the traditions inherited from the earlier generations and as a way of relaxing and bathing. Sauna culture continues the cultural practice of Finnishness among Finnish Americans. As one of those interviewed puts it:

*“They [saunas] clean you. It can be the heat of the summer or the cold of the winter. It is nothing that feels as good as going into the sauna. We love it.”*

Another one of those interviewed stated that Finnish heritage is established and represented in the buildings constructed by the immigrant Finns:

*“The elderly Finns built quality log houses. I guess it is [the heritage] for many people nowadays.”*

## Conclusions

The research findings of the study correspond with the research conducted on the significance of a place in providing well-being for older adults (e.g. Winterton & Warburton 2012; Bascu et al. 2012). The Finnish American elderly of the study especially emphasised the importance of their Finnish American heritage while

growing old. The respective cultural heritage was best outlived in a surrounding of its origin. The rural community enabled the daily functioning of the participants by enabling activities that cherished and was rooted in their cultural heritage. In a study by Bascu et al. (2012) keeping active was experienced as a feeling of being involved. Moreover, it should be noted that keeping active and being active and self-initiative in activities which are meaningful for one’s sense of self are important factors in supporting healthy ageing (Bascu et al. 2012). The research findings highlight the importance of understanding the role of culture in healthy ageing. In addition, as Steptoe, Deaton and Stone (2015) point out, older people maintain, and even increase, self-reported mental well-being by focusing on a more restricted set of social contacts and experiences. This is due to the fact that as people age, they accumulate emotional wisdom that leads to the selection of more emotionally satisfying surroundings, social circles and experiences. (Steptoe, Deaton & Stone 2015, 642.)

It can be argued that those interviewed experienced the feeling of community in which the community is experienced as a shared meaning of a place. There is also place attachment which is indicative of emotional relationships with a place where a place has acquired a meaning and uniqueness. As Winterton and Warburton (2012) argue, place attachment is important to older people and plays a significant role in fostering place identity. Memories of a place play a significant role in maintaining self-image, with autobiographical insideness providing the basis of identity in old age, as it provides continuity and preserves belonging (Winterton & Warburton 2012).

In conclusion, it could be argued with Bascu et al. (2012) that healthy ageing is a diverse phenomenon. Instead of mainly looking at policymakers’, health professionals’ and researchers’ views of healthy ageing, there should be more studies on the direct perspectives of rural older adults. This study has sought to accomplish this demand by portraying the significance of a heritage bound place for the well-being of a small ethnic minority group of Finnish American seniors. Therefore, it can also be argued that, in promoting the healthy ageing and well-being of Finnish American elderly, the significance of the heritage in the form of a unique local and cultural context should be acknowledged, maintained and promoted. It is all crystallised in the following statement of one of the elderly Finnish American interviewed:

*“You were born and raised here, you belong here. Because, I know, I went to a [big city] for almost 40 years and came back. So I guess it is what, how you were born and raised. Brings you back. Lots of people come back.”*

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Carita Saarikivi & Anne Eskelinen

## THE IMPACTS OF MULTIPROFESSIONAL LIVING LAB FOR MENTAL HEALTH REHABILITATION

### Abstract

The aim of this paper is to describe the impacts of multiprofessional Living Lab activities on promoting well-being and rehabilitation.

Laurea University of Applied Sciences and the association Keski-Uudenmaan Sopimuskoti Ry started the Mental Health Living Lab cooperation in spring 2015. The Mental Health Living Lab is an environment where rehabilitees, workers, students and lecturers are working together as equal partners.

The main purpose of the process is to develop mental health services together with rehabilitees and their families so that the users are the main actors in designing new practices and services. The Mental Health Living Lab combines research and innovation processes to user-centred development work.

The study was conducted using both qualitative and quantitative methods. The data was collected in a half-structured survey that the rehabilitees filled in. Altogether 50 rehabilitees answered the survey in spring 2018. According to the results, rehabilitees were mainly satisfied with the Living Lab activities, and most of them felt that the activities had a positive effect on their well-being. In the future, however, more

attention should be paid to rehabilitees' engagement and possibilities to participate in the planning of the content of the Living Lab activities together with the other actors.

**Keywords:** Living Lab, mental health, rehabilitation

## Introduction

Laurea University of Applied Sciences and the Keski-Uudenmaan Sopimuskoti association launched their Living Lab co-operation, the SOLA centre of expertise activities, in spring 2015. The objective was to develop mental health rehabilitation and the practices of mental health care in accordance with the Living Lab action model with the rehabilitees, their families, Laurea students, the Sopimuskoti staff and Laurea teachers as participants. The purpose of the co-operation was to promote rehabilitation and the development of students' authentic workplace skills as well as to create various encounters through diverse activities and co-operation.

The Keski-Uudenmaan Sopimuskoti association provides target-oriented rehabilitation and support activities for mental health rehabilitees in outpatient care. The activities of Sopimuskoti include rehabilitative day activities and training for work, housing services and work with rehabilitees' families. Sopimuskoti provides diverse services related to coping in everyday life, housing, rehabilitation, employment and leisure activities. In spring 2018, altogether 77 rehabilitees were using Sopimuskoti services, and the multidisciplinary team of employees consisted of 15 people.

Pirkko Lahti, promoter of the SOLA centre of expertise activities, specifies the SOLA centre of expertise as a place in which mental health rehabilitees can study and learn everyday life skills, communication, marketing and social skills as well as engage in day activities and training for work together with Laurea students. Sopimuskoti rehabilitees and Laurea students enhance their competence and skills equally through learning. (Lahti 2017.)

## Living Lab co-operation at the SOLA centre of expertise

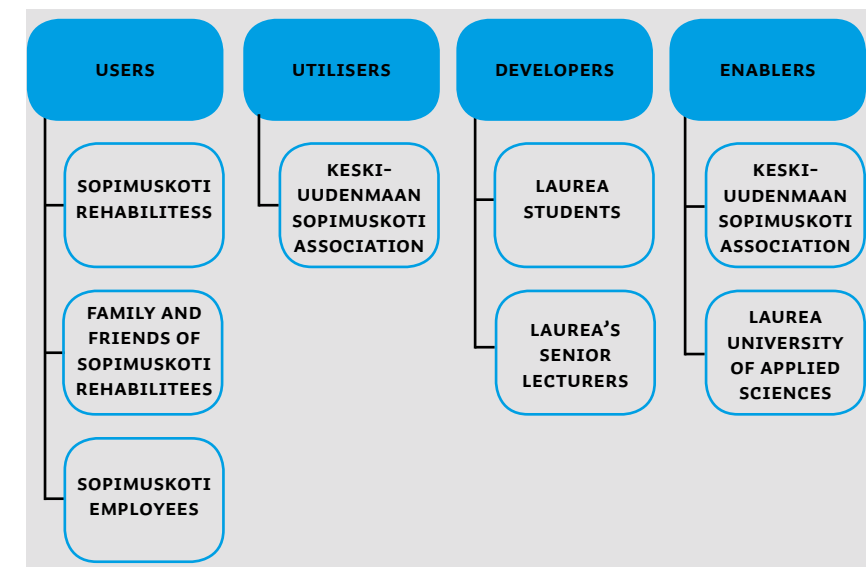
The Living Lab concept can be specified as a user-driven and open research and development concept that is very suitable for innovation related to the development of new activities and areas. The Living Lab operating environments are different from other innovation activities in that they are permanently established and can be used for carrying out projects. (Heikkanen 2012, 9–10.)

The Living Lab activities consist of four basic elements: user-driven approach, real-life development environment, open innovation and ecosystem. In user-driven work, the users of a product or service participate in the design stage as active participants, and they take part in the work by developing and implementing ideas and

by giving feedback on the use of the product or service. Users are seen as experts who highlight potential challenges of everyday life and development aspects. This means that Living Lab activities are carried out in a genuine real-life environment; the development takes place in everyday life. Open innovation is based on the idea that those participating in the activities share their ideas and development suggestions in the multidisciplinary Living Lab network. Trust and an open atmosphere promote co-operation between the participants. (Heikkanen 2012, 11–12; see Ståhlbröst & Holst 2012.)

The Living Lab ecosystem consists of participants with different roles and tasks in the development work. Living Lab activities are led by a team of operators that organises the activities and is responsible for connections between the various participants. Users play an important role, testing the product or service in their everyday life. Utilisers, such as companies, are provided with the opportunity for research, development or innovation related to their product or service. The developers' role is to provide methods, tools and resources for carrying out the activities. Developers are often schools, research institutes or companies. The enabler can be the city or a public actor that supports the Living Lab activities by creating practices or, for example, by funding the activities. (see Leminen 2015; Heikkanen 2012, 13–15)

Figure 1 shows the SOLA centre of expertise ecosystem. In these activities, the Sopimuskoti rehabilitees, their family and friends and Sopimuskoti employees are the users, while the entire Keski-Uudenmaan Sopimuskoti association can be seen as the utiliser. Laurea students and senior lecturers are the developers, and the enablers are the Keski-Uudenmaan Sopimuskoti association and Laurea University of Applied Sciences.



**Figure 1.** The Living Lab ecosystem of the SOLA centre of expertise activities

From Laurea's perspective, the Living Lab activities combine the three statutory tasks of universities of applied sciences: RDI, regional development and education. For years, Laurea University of Applied Sciences has had a central role in the development of the Living Lab activities in Finland and Europe. The SOLA centre of expertise, run jointly by Laurea and Keski-Uudenmaan Sopimuskoti, is the first Living Lab aiming for the development of mental health care.

## Development activities at the SOLA centre of expertise Living Lab

The first developer teams consisting of Laurea students worked at Sopimuskoti during the academic year 2015–2016, participating in work with the rehabilitees' families, day activities, training for work, communication and marketing and providing support for everyday life. The activities were planned and carried out in co-operation with the rehabilitees, families, friends and employees. Group activities focusing on mental well-being, creative methods and art-oriented activities were at the core of the activities. In addition, the rehabilitees' well-being was supported through health measurements and health-promoting instructed activities. Support for families and friends was provided through interviews and by arranging events at which they could meet peers and discuss their role as a person close to the rehabilitee.

The rehabilitee's active contribution is the foundation for rehabilitation. According to Rissanen (2015), the most important elements of mental health rehabilitation include encounter, interaction, maintenance of hope, peer support, inspiring activities and reflection on one's experiences. The significance of recovery in mental health rehabilitation has continued to expand; personal recovery aims for a better and significant life in a role that is satisfactory for the rehabilitee (Korkeila 2017). Engagement is indicated by appreciation, equality and trust, which increases the opportunities to have an influence in one's own community. Development carried out together enables the customer to find a new way of being engaged in various services and roles associated with them. The co-operation includes defining the purpose of the activities, looking for solutions and implementing the activities so that different perspectives are strongly present in different encounters and structures. (Hietala 2018; Laitila & Pietilä 2012.)

In autumn 2016, recovery orientation-based joint mental health rehabilitation development work was initiated at Sopimuskoti. Recovery orientation was chosen as the model for the activities, because the activities as such had already included a lot of recovery orientation-related work. The objective was to use the model to further enhance and clarify the adoption of rehabilitees' stronger personal role and the support for this role.

The recovery orientation concept is based on the idea of the rehabilitee being at the centre of his or her own treatment path; the entire treatment process should aim

to support the rehabilitee's personal growth process (Davidson & White 2007). The recovery orientation ideology includes four principles: quality of life, engagement, hope and identity. Co-operation with the rehabilitee involves a partnership that is based on the rehabilitee's personal resources and skills, peer support and maintenance of hope. Quality of life includes the rehabilitee's physical and mental well-being, empowerment and discovery of significant aspects in one's own life. Engagement includes the development of a satisfactory social life through means such as peer support and participation in various collectives. The element of hope is based on the idea that it is possible for rehabilitees to achieve their personal goals, foster a positive attitude to the future and believe in personal success. The development of identity aims for acceptance of the disorder as part of the rehabilitee's personality, without letting it define the individual or his or her future. Recovery orientation aims to support a normal state of being, in which rehabilitees can make their own choices in accordance with their personal resources and strengths. According to the model, the rehabilitee also has the right to make mistakes and fail. The recovery orientation model gives space for the rehabilitee's personal active participation in accordance with their personal capacity. The language used in the co-operation is also very important; it emphasizes the opportunities in the rehabilitee's life. (Andresen et al. 2003; Knutson, Newberry & Shaper 2013; Slade et al. 2014; Nordling; Järvinen & Lähteenlahti 2015.)

Before the recovery orientation-related development work was launched, a training session was arranged for the personnel to become familiar with the recovery orientation model and to compare it with the current work procedures. In accordance with the ideology of action, it was considered essential that the rehabilitees train together with Laurea students to enhance their personal engagement and well-being by participating in activities arranged by the students, such as creative activity groups, excursions and workshops. The rehabilitees could plan and implement activities together with the students. In the groups, the rehabilitees had the opportunity to train identifying their personal strengths and weaknesses, expressing themselves as well as studying and strengthening their personal, more active identity. The students also arranged health measurement days, paying particular attention to the monitoring and promotion of somatic health. In addition, seminars related to the SOLA centre of expertise activities were held at Laurea and Sopimuskoti to jointly describe the experiences gained from the activities together with the Living Lab actors as well as the results of the development.

There is evidence of the use of recovery orientation particularly with respect to reduced symptoms of depression and anxiety. In addition, activities based on recovery orientation have promoted rehabilitees' personal growth. This can be seen as increased hopefulness, ability to cope and ability to learn something new (Knutson et al. 2013). According to Laitila & Pietilä (2012), engagement also has an empowering effect, which promotes the feeling of control, enhances self-esteem and generally reduces the discrimination and stigma associated with mental health problems. Recovery orientation-related services have also been found, to some extent, to reduce the number of inpatient days, increase participation in education and



reduce criminal activity (Kidd et al. 2011). Client involvement and engagement mean accepting, noticing and using the service users' expertise as a part of collaboration. Involvement is important in one's own care and recovery and through the development of services and service delivery. (Laitila 2010.)

Co-creation entails a new vision of value creation through thinking about the co-creators of value and the entire value of ecosystems (Ramaswamy & Ozcan 2014; Ramaswamy & Gouillart 2010). According to Cheverton and Janamian (2016) the co-creation development process in recovery program was part of achieving the co-created outcomes, which included new ideas and changes to existing mental health interventions and practices. Results shows increased understanding and awareness of end users' needs and help to ensure resources more effectively. Co-creation produces better quality for the customer. (Cheverton & Janamian 2016.)

## Implementation of the survey

The survey was carried out in spring 2018. The objective was to survey rehabilitees' participation in the SOLA centre of expertise activities and their experiences of the group activities arranged by the students. In addition, the survey studied whether the Living Lab activities had influenced the rehabilitees' well-being and recovery.

The questionnaire included four questions related to the respondent's background. These questions concerned the respondent's gender, age and the category of day activities or training for work that the respondent participates in at Sopimuskoti. In addition, the respondents were asked to specify how long they had been participating in the joint activities of Sopimuskoti and Laurea.

With respect to Living Lab, the respondents were asked to specify which activities instructed by Laurea students they had attended. The five-point Likert scale was used to survey the rehabilitees' opinion on the implementation of the group activities arranged by the students. On the scale, number one meant 'disagree' and number five meant 'agree'. The themes were designed in accordance with the sections of the recovery orientation model. The themes were guidance and support, co-operation, content and meaningfulness of the activities, one's own possibilities for influence and the schedule and group size. The effects of the SOLA Living Lab activities on the rehabilitees' well-being were surveyed using ten Yes/No statements. At the end of the questionnaire, the rehabilitees could write down positive and negative feedback on the Living Lab activities.

## Review of the results

Altogether 50 rehabilitees answered the survey. Four answers were rejected because of incomplete information. Of the respondents, 35 were men and 11 women. Their average age was 43 years. Of the respondents, 16 participated in day activities at Sopimuskoti and 36 in training for work. Training for work is arranged at

Sopimuskoti as two different types of activity. Seven respondents said that they attend both day activities and training for work, and one participated in the two types of training for work.

Thirty-six respondents had participated in the health measurements arranged by the students, and 22 respondents had participated in the recovery orientation groups. Twenty-two respondents had participated in the visual expression group activities, and 18 had attended the music and physical exercise groups. Other forms of group activities included a drama group, a creative writing group, culture theme weeks and a group for support in everyday life. The seminars arranged by Laurea were attended by 28 rehabilitees. The respondents to the survey had participated in one to nine types of SOLA centre of expertise activities.

More than half of the respondents (N=24) had participated in the Living Lab activities for more than two years. Seven of the respondents had participated for less than six months; also seven had participated for six to twelve months, and four respondents had participated for one to two years. Four respondents did not specify the duration of their participation.

Table 1 shows the average figures for the statements related to the implementation of the group activities arranged by students. The variables are 'participation in Living Lab activities for more than two years' and 'participation of two years or less'. In addition, the statements are viewed on the basis of the number of the types of Living Lab activities that the rehabilitees attended. The variables are 'participation in one or two types of activity' and 'participation in three or more types of activity'.

Table 1. according to the average scores for all (N=46) the respondents, the rehabilitees are satisfied (average score above 4.00) with the guidance provided by the students, the co-operation with Laurea, the support provided by the students, the size, content and themes of the groups and the scheduling of the activities. The average is lower for statements related to the usefulness of participation (average score = 3.8) and possibilities to influence the content of the activities (average score = 3.38).

When comparing the scores for different variables, the average scores for answers from rehabilitees who participated in one or two types of activities and whose participation had lasted for less than two years were clearly lower compared with those whose participation had lasted for more than two years and who had participated in three or more types of activities. For the statement 'I found participation in the groups useful', the average score ranges from 3.19 to 4.14, and for the statement 'I was given the opportunity to influence the content of the activities' it ranges from 2.94 to 3.68. The average score for the statement 'The themes of the groups were interesting' ranges from 3.59 to 4.44. The activities were voluntary for the rehabilitees. Therefore, it is possible that those who found the activities most useful participated for a longer period of time or participated in more groups. This may partially explain the differences in the averages between the variables and the higher scores for these groups. In particular for rehabilitees who had joined the Sopimuskoti activities

quite recently, the degree of orientation to the activities could be discussed, as well as their more limited opportunities for influence because of the shorter duration of their participation. On the basis of the results, it should also be contemplated whether the activities should be developed to engage the rehabilitees more closely in the planning of the activities, so that the activities would better match the rehabilitees' interests.

**Table 1.** Rehabilitees' experiences of the implementation of the group activities

STATEMENTS	ALL N=46	PARTICIPATION FOR OVER TWO YEARS N=24	PARTICIPATION FOR LESS THAN TWO YEARS N=18	PARTICIPATION IN THREE OR MORE TYPES OF ACTIVITY N=28	PARTICIPATION IN ONE OR TWO TYPES OF ACTIVITY N=18
I RECEIVED ENOUGH GUIDANCE ON PARTICIPATION IN DIFFERENT GROUPS	4.24	4.38	4.06	4.52	3.83
CO-OPERATION WITH LAUREA WAS EASY	4.29	4.52	4.06	4.54	3.88
I HAVE RECEIVED SUPPORT FROM THE STUDENTS WHERE NEEDED	4.12	4.3	3.76	4.37	3.69
THE NUMBER OF PARTICIPANTS IN THE GROUPS WAS SUITABLE	4.36	4.43	4.17	4.59	4
THE QUALITY OF THE CONTENT OF THE GROUP ACTIVITIES WAS GOOD	4.18	4.43	3.89	4.43	3.76
THE THEMES OF THE GROUPS WERE INTERESTING	4.11	4.3	3.83	4.44	3.59
I WAS GIVEN THE OPPORTUNITY TO INFLUENCE THE CONTENT OF THE ACTIVITIES	3.38	3.68	2.94	3.62	3
THE TIMETABLE OF THE ACTIVITIES WAS SUITABLE FOR ME	4.07	4.17	3.83	4.15	3.94
I FOUND PARTICIPATION IN THE GROUPS USEFUL	3.8	4.13	3.33	4.14	3.19

Table 2 shows the effects of the SOLA centre of expertise activities on the rehabilitees' well-being. The effect of the activities on mental and physical well-being and social contacts as well as the rehabilitees' opinions on the effect of the activities on the progress of rehabilitation were surveyed using yes/no statements.

**Table 2.** The effects of the Living Lab activities on the rehabilitees' well-being

THE LIVING LAB ACTIVITIES ARRANGED BY STUDENTS HAVE	YES	NO	DID NOT ANSWER
REDUCED MY FEELING OF LONELINESS	30 (65.2%)	8 (17.4%)	8 (17.4%)
IMPROVED MY MOBILITY	23 (50%)	16 (34.8%)	7 (15.2%)
INCREASED MY KNOWLEDGE AND SKILLS	32 (69.6%)	7 (15.2%)	7 (15.2%)
INCREASED MY SOCIAL INTERACTION	31 (67.4%)	7 (15.2%)	8 (17.4%)
GIVEN ME NEW FRIENDS/ACQUAINTANCES	20 (43.5%)	15 (32.6%)	11 (23.9%)
GIVEN MOMENTUM TO MY EVERYDAY LIFE	33 (71.8%)	6 (13%)	7 (15.2%)
GIVEN ME THE OPPORTUNITY TO SHARE MY OPINIONS AND EXPERIENCES	29 (63%)	7 (15.2%)	10 (21.7%)
IMPROVED MY MENTAL WELL-BEING	25 (54.3%)	12 (26.1%)	9 (19.6%)
PROMOTED MY REHABILITATION	32 (69.6%)	8 (17.4%)	6 (13%)
PREVENTED DETERIORATION OF MY MENTAL HEALTH	26 (56.5%)	11 (23.9%)	9 (19.6%)

According to the rehabilitees' assessment of the effects of the Living Lab activities on their well-being, the most positive effects were related to reduced feeling of loneliness (65.2%), increased knowledge and skills (69.6%), increased social interaction (67.4%), momentum in life (71.8%) and progress of rehabilitation (69.6%). Only half of the respondents found that the activities improved their mobility, and less than half gained new friends or acquaintances through the activities. It should be noted that some rehabilitees did not provide answers to statements related to the effects of the Living Lab activities on their well-being.

Altogether 26 rehabilitees provided written feedback related to the positive effects of the Living Lab activities. According to this feedback, the students' participation in the activities was a positive element. The students were glad and cheerful, and encounters with them provided new experiences for the rehabilitees. The joint activities were mutually interesting for the participants. According to the rehabilitees, it was a good thing that the students also gained important experience from their participation in the activities with the rehabilitees. The regular daily rhythm developed through the activities was also a positive effect. Many rehabilitees praised the group activities in their feedback and said that they catered for many interests. The competent instructors received a lot of praise. According to the rehabilitees, the groups had a good team spirit and everyone had found something interesting to do. The group activities were a welcome variety to training for work, and being able to

freely be yourself was mentioned as one of the positive elements. According to the feedback, learning something new was a very useful result of the group activities. The rehabilitees had received information about themselves through various health measurements and fitness tests. Excursions outside Sopimuskeskus were also mentioned as positive experiences in the feedback, and the rehabilitees mentioned that they would particularly like more visits to museums.

Altogether 13 rehabilitees provided ideas for the improvement of the Living Lab activities. According to the feedback, the size of the groups should be reconsidered. The rehabilitees found that the groups were restless because they had so many participants. They did not have the chance to become properly acquainted with everyone. Some rehabilitees found that the content of the group activities was monotonous and there was nothing new for them. Some rehabilitees said that the content could be more concise, and one respondent said that the group activities felt childish. With respect to students, respondents had noticed uncertainty. However, according to the feedback, the rehabilitees were satisfied with the current activities in general and did not find anything negative about the concept. Overall, the group activities instructed by the students received positive feedback from the rehabilitees.

## Conclusions

According to the recovery orientation model and the principles of the Living Lab activities, the rehabilitees (the users of the services) should be at the centre of the development of mental health services (see Hietala 2018; Heikkanen 2012). According to the survey, the rehabilitees were satisfied with the implementation of the group activities provided by the students as well as the other activities of the SOLA centre of expertise. The Living Lab activities that are based on the recovery orientation model have aimed to engage rehabilitees in activities and joint development that promote their rehabilitation. The joint activities have aimed to enhance the rehabilitees' ability to express their own needs and wishes in the planning and implementation of their rehabilitation.

According to the results of the survey, ways for enhancing the rehabilitees' engagement and opportunities for influence in the SOLA centre of expertise activities should be discussed to make the rehabilitees' role more the role of an active player. The meaningfulness of the group activities from the rehabilitees' perspective should also be considered. The SOLA centre of expertise activities should be based on rehabilitee-driven activities in accordance with the recovery orientation model, so that the rehabilitees' strengths, wishes and experiences of success could be taken into account even better and help the rehabilitees to take their own resources into use (see Nordling; Järvinen & Lähteenlahti 2015).

On the basis of the survey it can be concluded that the rehabilitees' competence improved through the joint activities, as knowledge and experiences were shared between different actors. Active participation in different groups increased the rehabilitees' skills and their knowledge of themselves. The groups provided opportunities for learning something new as well as important monitoring of one's personal well-being. The group activities arranged by the students have supported the development of social contacts in accordance with the participants' personal interests and wishes. At their best, Living Lab activities have promoted rehabilitation and improved the rehabilitees' mental well-being.

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Aulikki Yliniva

## EXPERIENCES GAINED FROM TRAININGS ON 'DEMANDING SITUATIONS IN ELDERLY CARE'

### Summary

Challenging behaviour among elderly people is quite common. Elderly people sometimes refuse the necessary treatments or care. The client's resistance towards carers can negatively affect to their well-being. Behind this kind of behaviour are often memory problems which have led to diminished functional ability. Even if the person's ability to make decisions has diminished, the nurse's number one duty is to support the person's own decision-making. Sometimes it is difficult for the nurse to decide when it is possible not to do the treatment regardless of the resistance of the client. Sometimes elderly people can also be aggressive towards each other or carers. Carers need to be trained to meet these challenges.

This article describes the experiences of a new type of training for carers at elderly nursing units and homecare. The training was a mixed model of two programmes, Management of Actual or Potential Aggression® (MAPA®) and Dementia Capable care. MAPA® is developed in England and the US by an international professional group. It was created for the best care for challenging situations, where staff has to be professional and meet difficult situations in a calm and safe way. Dementia Capable Care is defined just for working with elderly clients with memory problems. It offers preventive methods to strengthen nurses' professional acts. The idea is to recognise the reasons for challenging behaviour as well as the attitudes and ways



of action at own work. The purpose of the training is to develop a nurse's abilities to strengthen the functional capacity of the elderly and prevent the challenging behaviour. The Best Ability to Function© model gives the tool to find out and understand the changes in a person's function. Besides the preventive ways, this model offers skills to protect oneself as well as lead and limit when it is necessary.

The purpose of the paper was to describe the experiences of the mix model of training, which was offered to carers at elderly care. The Research question was: "How the personnel of a Finnish municipality experienced the training 'Demanding situations in elderly care'?"

The participants of the study were 76 carers at the Finnish municipality who participated in the training 'Demanding situations in elderly care' during 2017-2018. Data was collected as a questionnaire which was fulfilled after every training and, therefore, the response was 100%. There were both quantitative questions and open questions. Quantitative questions were gone through by calculating the average numbers from each question. Open questions were analysed by using qualitative content analysis.

The training answered to participants' needs according to this study. The overall evaluation of the training "Demanding situations in elderly care" was 4.6 (max. 5) and the training was also relevant to their needs, on average 4.3 (max 5). In open questions, they described new methods in demanding situations, improved evaluation and improved safety.

During the last year's homecare and enhanced service housing have grown. At the same time, psychological problems among elderly with memory problems, the use of intoxicants and living alone have increased challenging behaviour. Employees need more information and guidance on how to face challenging customers. The need for this kind of training is imminent.

## Introduction

Sometimes elderly clients can refuse the necessary treatments or care. A person may not understand why they should accept care or even eat or drink. Sometimes they can also be challenging or even hostile towards each other or their carers. Behind this kind of behaviour are often memory problems which have led to diminished functional ability. Behaviour is communicative for cognitively impaired individuals who may have lost their ability to express their needs.

Due to the resistance and occasional aggressive behaviour among the elderly, carers need to be trained to meet these kinds of challenges. Management of Actual or Potential Aggression® and Dementia Capable Care are two training methods which were combined and offered to several groups of carers in Finnish municipality. The purpose of this article is to describe the experiences of a new type of training to carers at elderly nursing units and homecare.

## Challenging behaviour among the elderly

Elderly services emphasise domestic and other outreach services. It has led to a reduction in institutional care for those over 75 years of age. Both home and living in enhanced service housing have grown. The increase in the proportion of dysfunctional and multi-patient clients has increased the need for comprehensive and nursing expertise for homecare staff. Elderly psychological problems, the use of intoxicants and living alone increase the challenges for the future service system, where homecare clients are more demanding and require new and emerging services tailored to individual needs (Paljärvi, 2012).

Approximately 90% of clients with memory problems will develop behavioural disruptions. Mild disruption might include things like repetitive questioning, and moderate disruption might include wandering or agitation and combativeness during meal or bath times. The highest disruption can be agitation or physical aggression, which are widely known behavioural manifestations among clients with memory problems. Agitation generally implies behaviours related to discomfort or confusion. Aggression clearly implies hostile physical motion, regardless of the trigger or intent. Violence or severe aggression is defined as physical aggression or threats of harmful physical contact. This may include being hit, kicked, pinched, shoved, grabbed or bitten. This may also include believable threats to the carer, or physical aggression against property that could induce fear of danger in the carer (Wharton & Ford, 2014).

Several things have been correlated as triggers for severe aggression or violence, including: unidentified need and resulting frustration, pain, reduced vision and/or hearing, changes in the environment, excessive noise or activity, limited privacy or space, and quality of relationship or presence of reciprocal aggression with carers (Wharton & Ford, 2014).

Homecare workers face violence and threat of violence regularly during their work. In homecare, the threat of violence is increased by working alone, late in the evening. 45% of Finnish home nurses were subjected to psychological violence or intimidation and 11% of physical violence. Since the 1990s, violence as a load factor has been increasing in homecare. Especially in the care of the elderly, violence is more of a concern (Fagerström & Leino, 2014). Situations with psychological violence and the threat of violence are more common than physical or sexual violence. Based on the responses, physical violence was mainly pushing and holding. Some respondents reported that their passage was blocked. In addition, the nursing staff experienced hitting and slapping. The results also indicate that homecare workers do not report the violence they experience as near miss reports (Kunttu & Oksanen, 2016). If the workers fail to report violence and threats, they basically express their acceptance of the disrespectful behaviour of the customers or to be able to handle it independently (Fagerström & Leino, 2014).

## Ethical challenges, maximising freedom & choice

The client's resistance towards carers can negatively affect their well-being. Awareness of the possibility of violence in your own work or co-worker experiencing the threat and violence situation may give rise to mental distress (Fagerström & Leino, 2014). In addition, if the nurse respects the client's self-esteem, relatives may think its neglect of care. According to the patient law, everyone has the right to necessary treatment and care. According to the constitutional law, the right for integrity is the basic right. Even if the person's ability to make decisions has diminished due to lowered cognitive capacity, the nurse's number one duty is to support each person's own decision-making. Sometimes it is difficult for the nurse to decide when it is impossible to perform the treatment.

Meeting the basic needs of clients in the most challenging situations can be avoided. Respect for privacy and dignity, personalised and respectful bathing and toileting routines as well as personal patient's bedrooms diminish challenging behaviour. The effects of these types of interventions were reported to reduce aggression by as much as 60%. Indeed, it has been suggested that "non-pharmacological interventions" are the key to management of behavioural disturbances in dementia. Emotion-based, active-learning-oriented staff educational programme are more effective ways in addressing aggression (Wharton & Ford, 2014).

However, clients or their relatives can suffer mental problems and/or substance abuse in addition to memory problems. All situations cannot be avoided. Carers need to increase their own risk and prevention awareness and prepare for domestic violence. Matters related to occupational safety are part of the professional qualifications of supervisors and employees in homecare. Employees should report violence or the threat thereof in the workplace so that action can be taken. (Fagerström & Leino, 2014).

This paper describes the training of staff to meet challenging behaviour in elderly care settings. The purpose of the training was to develop the skills of the staff to handle disruptive behaviour and develop dementia friendly communities helping elderly people to live in communities.

## MAPA® and Dementia Capable Care training

Management of Actual or Potential Aggression® (MAPA®) is designed to enhance participants' understanding and management of disruptive, aggressive and violent behaviour at various places, where staff has to be professional and meet difficult situations in calming and safety way. MAPA® is developed continually by international teamwork and it goes through certification process every year in England. In MAPA® courses, participants go through various deceleration and preventive strategies. They go through the decision making process when managing behavioural risk according to the laws, ethical principles and good practices. Participants practice

managing behavioural risk using disengagement and holding skills to protect themselves or others from strikes, kicks, catching and biting. All these methods are safe and suitable to be used with vulnerable clients without risks of harm or damage. Learning in a MAPA® course is based on cognitive learning theory, so active participation makes learning effective (Lerner workbook, 2016).

Dementia Capable Care training is developed to carers who work with people who have Alzheimer's disease or related dementia. These workers need special skills to provide person-centred care to clients who have extreme distress and complex needs in an elderly care settings. The focus of their work is based on abilities and skills utilising the remaining cognitive capacity, strengths and needs. The training consists of communication skills in calming and de-escalating as well as the most effective responses in behavioural challenges. Participants deepen their understanding of the Best Ability to Function© (BATF©), which gives the tool to investigate the changes in a person's functions. Participants evaluate and describe the stages of dementia planning in how to support elderly people offering suitable tasks to increase clients' individual abilities. It provides detail-oriented safety responses, for example, on how to get free from hair pulling or a bite and escape as well as how to assist care with holding methods when needed (Dementia Capable Care Participant workbook 2012, CPI Specialties; Dementia Capable Care 2017).

Staff need skills to work adequately in demanding situations. When the client is anxious, the staff member remains calm and is supportive, asking how she/he can help. In the dementia model, a lot of time is used for preventive actions. How we make everyday living easier by activating the remaining functions. This kind of work diminished anxiety and depression among clients. If the client starts to act defensively—shouting, screaming or appearing more restless—the staff member is more direct, giving short commands and separating the client separate from others. If the situation continues and the client threatens others or her/himself physically, staff have to use physical interventions. After the crisis situation, it must be discussed what happened and how we could prevent it in the future. The client also needs rest, compassion and care. We call this process the Crisis Development model. It clearly presents what staff must do. When a nurse responds well in every phase of a crisis, it strengthens the client's identity and integrity in preventing the situation from getting worse.

This paper describes the training in which these two models were combined, MAPA® and Dementia Capable Care. These models are quite similar according to ethical values and training bases, but there are differences in the content, too. Dementia Capable Care model is not translated in Finnish, so we used Finnish MAPA® Participant workbook, added with several group tasks from the Dementia Capable Care model. We also left away high risk physical interventions which are not suitable to use with vulnerable elderly clients. The objective of this training is specifically point to the need for improved quality of care for clients with memory problems at the elderly open care unit, consisting of nursing homes and homecare.

**Table 1.** Background of the Mixed model: 'Demanding situations in elderly care'

MAIN ITEMS	MAPA® FOUNDATION	DEMENTIA CAPABLE CARE	MIXED MODEL: DEMANDING SITUATIONS IN ELDERLY CARE
ETHICAL VALUES AND JURIDICAL BASES	CARE, WELFARE, SAFETY AND SECURITY	CARE, WELFARE, SAFETY AND SECURITY, ABILITIES-BASED PERSPECTIVE	CARE, WELFARE, SAFETY AND SECURITY, ABILITIES-BASED PERSPECTIVE.
DECELERATION AND PREVENTING STRATEGIES	SKILLS AND CONFIDENCE TO PREVENT, DECELERATE AND DE-ESCALATE CRISIS. JUSTIFICATION FOR ACTIONS.	NONVIOLENT CRISIS INTERVENTION (S <sup>2</sup> ). PERSON-CENTRED APPROACHES TO DEMENTIA CARE. JUSTIFICATION FOR ACTIONS.	PREVENTIVE STRATEGIES FROM MAPA®. PERSON-CENTRED APPROACHES FROM DEMENTIA CAPABLE CARE®. JUSTIFICATION FOR ACTIONS BY ESSENTIAL LAWS.
DECISION MAKING AND MANAGING BEHAVIOURAL RISK	RISK ASSESSMENT. LOW, MEDIUM AND HIGH RISK INTERVENTIONS IN DISENGAGEMENTS AND HOLDING SKILLS.	RISK ASSESSMENT. PERSONAL SAFETY TECHNIQUES, HOLDING AND PERSONAL CARE ASSIST; LOW AND MEDIUM RISK INTERVENTIONS.	RISK ASSESSMENT. PERSONAL SAFETY TECHNIQUES, HOLDING AND PERSONAL CARE ASSIST; LOW AND MEDIUM RISK INTERVENTIONS.
POST CRISIS MODEL	COPING MODEL	COPING MODEL SPECIFIED TO ELDERLY CARE SETTINGS.	COPING MODEL SPECIFIED TO ELDERLY CARE SETTINGS.
LEARNING MATERIAL	LEARNER WORKBOOK, THE MANAGEMENT OF ACTUAL OR POTENTIAL AGGRESSION® (2016).	DEMENTIA CAPABLE CARE® PARTICIPANT WORKBOOK (2012).	MAPA® LEARNER WORKBOOK AND PARTS OF DEMENTIA CAPABLE CARE® PARTICIPANT WORKBOOK: PART 1, UNITS 2, 3 & 4.

## The purpose of the study and study methods

The purpose of the study was to describe nursing staff's experiences of the training. The research question was: "How have the personnel of a Finnish municipality experienced the training 'Demanding situations in elderly care'?"

The study was conducted through a quantitative research method by using a questionnaire. The questionnaire included questions both in the response scale and open questions. The qualitative features of the study were the content-based content analysis of open response. In this questionnaire, the first five questions related to the

participant's own professional development faced with challenging situations, four questions concerned instructors and two questions the contents of the training and its suitability to each one. The questionnaire was made using the Likert scale from 1 (worst) to 5 (best). The answer options for the Likert scale were 1 = totally disagree, 2 = disagree, 3 = not the same or disagree, 4 = agree and 5 = completely agree. The last 2 open questions related to the topic of professional development to face challenging situations, the ability to use MAPA® training methods at work and the content of education.

The participants of the study were 76 carers at the Finnish municipality, who participated in the training 'Demanding situations in elderly care' during 2017 and 2018. The background of the participants was social and health care professionals who worked at the customer's home or small service units. The data was collected after every course (6), where all participants (76) fulfilled the completed questionnaire. Quantitative analyses were made by calculating the numerical average in each question. Open questions were analysed by using content analyses.

## Results

A description of the answers to the quantitative questions was made by calculating the average numbers to each question. The participants evaluated their own skills with 5 questions at the continuum from 1 (the worst) to 5 (the best) at the Likert scale. The overall numerical evaluation of their skills was 4.1 (max. 5).

**Table 2.** Participants' evaluation of their own skills

I BELIEVE...	
I CAN USE NON-VERBAL TECHNICS TO REDUCE RISK BEHAVIOUR	4,2
I CAN USE VERBAL DECELERATION SKILLS, LIKE GIVING FRAMES	4,2
I TAKE ADVANTAGE OF THE MAPA PRINCIPLES FOR PHYSICAL INTERVENTION SO THAT THOSE INVOLVED IN A CRISIS CAN AVOID INJURIES	4
I CAN USE SAFE PHYSICAL INTERVENTION METHODS AS A LAST RESORT IN SITUATIONS WHERE A PERSON IS IN DANGER TO THEMSELVES OR OTHERS	4
I CAN CREATE A THERAPEUTIC RELATIONSHIP WITH AN AGGRESSIVE PERSON AFTER A CRISIS	4

The participants evaluated their instructors with four questions (using examples, creating interest and comfortable learning atmosphere, and emphasising the philosophy), from 1 to 5 at Likert scale and the overall average number to 4 questions from 76 participants was 4.8 (max. 5). The participants also evaluated the content of training by two questions from 1 to 5 on a Likert scale. The training was relevant to their need, 4.3 (max. 5). The overall grade for the whole programme was 4.6 (max. 5).

## Description and analysis of the open questions

In the questionnaire, there were two open questions. To the first question: “My evaluation of this programme” there were 70 comments. The second open question was: “Additional comments on the education programme, teaching methods, course materials and/or instructor”.

The analysis of material-based qualitative or inductive data can be described as a roughly three-stage process involving 1) material reduction, 2) clustering of material, i.e. grouping, and 3) abstraction, i.e. the creation of theoretical concepts. Material reduction means reducing the material to a simpler form. The analytical unit can be, for example, a word, phrase or concept entity. Next, there was a clustering of the material, which in turn means grouping the responses into different groups based on their unifying factors. The third stage was abstraction. This step means that the answers are changed based on the two previous stages in the form of concepts. This gives a conceptual view of the subject of the study (Tuomi & Sarajärvi 2009, 108-112).

In this study, there were found three main categories to the first question: New methods in demanding situations, improved safety and evaluation. Here are the three tables describing the analysis process, material reductions, clustering material and abstraction.

**Table 3.** Example 1 from the analysis.

ORIGINAL SENTENCE	REDUCTION	CLUSTERING	ABSTRACTION
“I CAN USE THIS GUIDANCE IN MY WORKING LIFE”	GUIDANCE TO WORK	NEW KNOWLEDGE	NEW METHODS IN DEMANDING SITUATIONS
“I HAVE RECEIVED GOOD KNOWLEDGE FOR DEMANDING SITUATIONS WITH CLIENTS”	USEFUL KNOWLEDGE	NEW KNOWLEDGE	
“I HAVE RECEIVED NEW THINKING AND WAYS TO CARRY OUT NON-VERBAL AND VERBAL COMMUNICATION”	NEW WAYS TO COMMUNICATE	NEW SKILLS	
“I CAN BETTER PREVENT THE ESCALATION OF THE SITUATION”	PREVENTING METHODS	NEW SKILLS	
“I RECEIVED NEW PERSPECTIVES AND WAYS, E.G. DISENGAGEMENT SKILLS AT LOW RISK”	DISENGAGEMENT SKILLS	NEW SKILLS	
“I’VE LEARNED HOW TO USE A VARIETY OF TECHNIQUES TO CALM A CRISIS SITUATION”	VARIETY OF TECHNIQUES	NEW SKILLS	

**Table 4.** Example 2 from the analysis.

ORIGINAL SENTENCE	REDUCTION	CLUSTERING	ABSTRACTION
“I UNDERSTAND MY CLIENTS BETTER”	INCREASED UNDERSTANDING	WELFARE	IMPROVED EVALUATION
“I UNDERSTAND BETTER CLIENTS WITH DEMENTIA”	INCREASED UNDERSTANDING	WELFARE	
“I CAN PAY MORE ATTENTION TO MY OWN BEHAVIOUR”	ATTENTION TO OWN BEHAVIOUR	WELFARE	
“I CAN FACE THE CUSTOMER WITH MORE VERSATILITY”	VERSATILE ENCOUNTER	WELFARE	
“I’VE GOT THE KEYS TO DEAL WITH THREATENING ENCOUNTERS AMONG THE ELDERLY AND THE SICK”	KEYS TO THREATENING ENCOUNTERS	COURAGE	
“I’VE GOT THE CONFIDENCE TO FACE CHALLENGING BEHAVIOUR AMONG CUSTOMERS”	CONFIDENCE TO MEET CHALLENGES	COURAGE	

**Table 5.** Example 3 from the analysis.

ORIGINAL SENTENCE	REDUCTION	CLUSTERING	ABSTRACTION
“I CAN MANAGE THE SITUATION CALMLY AND PROFESSIONALLY”	SITUATION MANAGEMENT	CRISIS MANAGEMENT	IMPROVED SAFETY
“I CAN EVALUATE SITUATIONS, PEOPLE FASTER AND TACKLE INCIDENTS”	SITUATION EVALUATION	CRISIS MANAGEMENT	
“I STAY CALMER WITH CUSTOMERS, BECAUSE THERE IS A METHOD OF MAKING THE MOST OF IT”	CALMNESS WITH CLIENTS USING METHOD	CUSTOMER’S SAFETY	
“I CAN CARRY OUT THE RIGHT ACTIONS IN THE SITUATION REGARDING WHAT NEEDS TO BE TAKEN CARE OF”	RIGHT ACTIONS TO TAKE CARE OF CLIENTS	CUSTOMER’S SAFETY	
“I UNDERSTAND THE SITUATION BETTER FOR MY OWN SAFETY”	UNDERSTANDING SITUATIONS FOR OWN SAFETY	MY SAFETY	
“I KNOW WHAT TO DO IN DANGEROUS SITUATIONS”	INCREASED CONFIDENCE THROUGH KNOWING	MY SAFETY	



### New methods in demanding situations

This main category comprises two subcategories: new knowledge and new skills. The knowledge was about guidance for working in new ways. It was described as useful and practical. It helped everyday work with clients. It gave also new thinking which was possible to share with colleagues.

*“I learned new perspectives for handling aggressive situations.”*

*“I can use instructions/doctrines in working life.”*

Participants' new skills were both preventive techniques and physical intervention skills. They learned new ways to communicate. The participants mentioned various types of techniques which they had learned, especially disengagement skills were mentioned as useful.

*“I have received new thinking and ways for non-verbal and verbal communication.”*

*“I can change my behaviour in crisis situations.”*

### Improved evaluation

This main category comprises two subcategories: welfare and courage. Welfare increased the ability to understand clients and their versatile encountering. There were several comments about understanding clients better. More attention was paid to personal behaviour and the prevention of crises.

*“I understand clients with dementia better.”*

*“I can face the customer with more versatility.”*

*“I can pay more attention to my behaviour and prevent crisis situations.”*

*“When security improves, welfare increases.”*

Learning gave keys to threatening encounters and increased courage. When people have knowledge about the reasons for challenging behaviour as well as ways to calm down clients in crisis, they can be braver and operate better in demanding situations.

*“I am braver.”*

*“I've got the keys to handle threatening encounters with the elderly and sick people.”*

*“I've got the confidence to face challenging behaviour among customers”*

*“I can evaluate situations, people faster and tackle incidents.”*

### Increased safety

Increased safety was described through crisis management and own and clients' safety. Crisis management comprised comments of evaluation and the management of the whole situation.

*“I can manage the situation calmly and professionally”*

Customers' safety comprised comments of remaining calm and knowing the right actions to take care of clients. The participants described increased ability to respond adequately.

*“I stay calmer with customers because there is a method of making the most of it.”*

*“I hope my ability to break free without excessive physical strength from the elderly person has grown.”*

Own safety was based on understanding situations from the security aspect. New skills were also described to increase own safety.

*“I understand the situation better for my own safety.”*

*“I'm better aware of what to do in dangerous situations.”*

*“I have disengagement skills and can protect myself and those are important techniques.”*

### Comments on the whole programme

The instructors were evaluated well according to 10 references: *“The instructor made the subject so interesting that the day went fast.”* The course material was praised at 8 references: *“High-quality course materials, theory and practice went hand in hand.”*

The training programme was versatile and useful according to 18 references. Combining theory, discussions and practical exercises was considered good: *“Good training as a whole, exercises give you the confidence to take it into practice.”* There were some critical comments about difficult words. A couple of participants hoped that the training would be organised separately for various working groups with different needs.

### Conclusions

Elderly services emphasise domestic and other outreach services. It has led to a reduction in institutional care but homecare and enhanced service housing have grown. Elderly psychological problems, the use of intoxicants and living alone have

increased challenging behaviour among the elderly, especially elderly with memory problems. Employees need more information and guidance on how to face challenging customers. The most important development proposal is to create guidance for the homecare workers who encounter critical situations and how they can process the situations afterwards (Kunttu & Oksanen, 2016).

The training 'Demanding situations in elderly care' answered to participants' needs according to this study. The overall evaluation of the training was 4.6 (max. 5) as an average of all 76 participants. The training was also relevant to their needs, on average 4.3 (max. 5). Some participants wanted separate programmes to various units because the need of training wasn't similar in all the units.

The participants evaluated their own skills developed in this training, quite well, 4.1 (max. 5). They were more critical towards themselves than the instructors, whose overall evaluation was 4.8 (max. 5). However, in the open questions, they described new methods in demanding situations, improved evaluation and improved safety. An increased feeling of confidence was also a significant result. When people know what to do in order to manage situations the fear decreases and well-being at work increases.

Positive approaches to risk must include all the training. It is the basic thing in all patient centred approaches. MAPA® and Dementia Capable care are based on positive attitudes to challenging behaviour. Clients have reasons why they behave badly, and carers need to understand that in order to prevent a crisis. According to the Department of Health (2011), keeping the person at the centre, focusing on what is important to the person and continuing to listen and learn from the person helps a lot to prevent a crisis. Treating family and friends as partners and an intention to build connections within the community makes the quality of care better.

Reliability could be tested if someone else makes the same study and comes to the same conclusions. Now, all the participants answered the questionnaire regarding what increases reliability. However, it was just a pilot group of this kind of training with 76 answerers. More investigation is needed to show how suitable and important this kind of training might be. Ethically, there was no harm done to anyone from the analysis of the questionnaire. Although the participants take care of vulnerable clients, the clients are not involved and there is no individual knowledge of anyone. On the contrary, there can be some benefits for clients when the training of their carers develops.

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## FUTURE PERSPECTIVES



Hiroo Hagino, Tetsuya Abe, Hannele Niiniö & Päivi Putkonen

## TOWARDS NEW WAYS OF PROMOTING MENTAL WELL-BEING AND COGNITIVE FUNCTIONS

### Importance of Prevention

Advanced countries share hard challenges in employing limited resources to deal with our progressively aging societies. In fact, Japan and Finland are front runners in the developing transition from aging to aged societies. This is the common background behind the research cited in this publication. In Japan, after establishment of the Long-Term Care Insurance scheme in 2000, demands for long-term care have increased more than projected (unfortunately exacerbated by services provided more to drive profits than benefit clients). Given this situation, the Japanese government began to stress the importance of prevention as a way to make efficient use of limited resources. Scientific, evidence-based long-term care preventive services (avoiding or delaying the need for long-term care), like the Musculoskeletal Functional Improvement Program, Oral Cavity Functional Improvement Program, and Nutrition Improvement Program have been part of the Long-term Care Insurance scheme since 2006.

Among Nordic Welfare States Finland has weighted on preventive care services like, maternal clinics, free education and school lunch, counseling in health care centers and elderly care systems. Health problems like alcohol addiction, dementia and depression have been traditional national diseases and comprehensive prevention for such mental problems have been researched and developed. In the Japanese MEXT project Knowledge Cluster Initiatives (2007-2011) "Sendai Cluster for Advanced

Preventive-based Community Health", data was collected and benchmarked in co-operation with Laurea about advanced cases for prevention in Finland<sup>1</sup>.

Based on experience both in Finland and in Japan, it seems clear from the perspectives of both effective social resource management and QOL of individuals, that it is more effective and efficient to invest resources in keeping aging individuals healthy and treating their health issues early, rather than responding after they have become "patients"—bed-ridden and/or in need of long-term care.

### Mental health and dementia

Mental illnesses have been traditionally classified in Finland to five major National Disease groups, and in Japan, those have been classified under the Japanese medical care plan as one of the Five Major National Disease groups since 2001. Mental health is a major challenge facing Japan, as the number of individuals with mental illnesses continues to rise. In Finland, the coronary artery disease is the most common illness. During the economic depression of the late 1990s, mood disorders sharply increased and now represent over 30% serious of diagnosed mental illnesses in Japan. Preventive services and mental health promotion programs are urgently needed to help high-risk (e.g., depressed) individuals avoid becoming dependent on long-term medical care.

Over the past 30 years, the incidence of Alzheimer's disease has also risen dramatically<sup>2</sup>. At the 2013 G8 London Dementia Summit, the G8 agreed to promote global collaboration on dementia-related issues. As in Japan, the populations of China, South Korea and Singapore are rapidly aging, and dealing with the challenge of dementia will certainly be a worldwide issue in the near future.

In Japan, cases of dementia are expected to soon far exceed previous levels. According to Japan's Ministry of Health, Labor and Welfare (MHLW), in 2012 there were 4.62 million individuals with dementia and more than 4 million with mild cognitive impairment (MCI). In 2025 the Japanese baby boomer generation will be over 75 years old, with more than 7 million likely suffering from dementia and about 5 million dealing with MCI. Dementia itself is currently incurable, but it is possible to reduce risk factors and slow its rate of advance through early detection and intervention. It is thus clear that reducing risk factors through functional improvement therapy, as

1) With collaboration of Laurea University of applied science and Helsinki School of Economics, I collected data for example of NEUVOLA and self-care cases with ICT etc. Advanced preventive health care services in Finland ([http://sendai-cyber.icr-eq.co.jp/cluster/program/programo3/files/pgmo3\\_04.pdf](http://sendai-cyber.icr-eq.co.jp/cluster/program/programo3/files/pgmo3_04.pdf)) November 20th 2018, Best Practices in Finnish Health Care Prevention ([http://sendai-cyber.icr-eq.co.jp/cluster/program/programo3/files/pgmo3\\_05.pdf](http://sendai-cyber.icr-eq.co.jp/cluster/program/programo3/files/pgmo3_05.pdf)) November 20th 2018.

2) According to the Japanese MHLW's "Patients Statics," the numbers of Alzheimer patients were 400 in 1984, 55,000 in 1996, 86,000 in 2005 and 92,000 in 2014. OECD's 2017 data put the Japanese lifetime prevalence of Alzheimer at 2.33 %, the highest among OECD countries.



well as early detection and treatment, are essential—especially prevention/delay of MCI (a common precursor to dementia).

## Disincentives to participation in preventive services and demand for “new” functional improvement programs

As seen in the Introduction to this publication, many preventive services aimed at mental health and dementia have been put in place. These are not only medically oriented (aimed at preventing organic changes/lesions), but also focus on programs for improving function for daily living and reducing risk factors for conditions like dementia and depression. For example, regular exercise, outings, hobby groups and opportunities to express our feelings and concerns are all helpful in avoiding disuse syndrome, which can lead to depression and other mental issues.

For dementia prevention, programs focusing on avoiding or recovering from MCI, like regular exercise, dietary and sleep improvements, increasing social contacts, and increased mental activity and cognitive function training are found to be effective. Based on this scientific evidence, a variety of effective preventive services have been developed and employed under Japan’s Long-Term Care Insurance scheme in Japan. In Finland preventive services have been offered by municipalities, NGOs and often financed and evaluated by the Social Insurance Institution of Finland (KELA). In Japan, as integrating preventive services with health care and social care, gathering places (“Ba” in Japanese) are being developed to facilitate these efforts through greater convenience and synergy.

While use of these services has risen rapidly, still only 4.2% of elderly individuals participate. In 2011, I (Hagino) surveyed elderly individuals in Sendai regarding disincentives to participate in preventive services<sup>3</sup>. Although very conscious of the need for prevention, why did they not participate in these scientific, evidence-based, effective, convenient preventive services offered at little or no cost? Aside from those who simply responded, “I was not invited,” two major reasons emerged.

**Reason 1:** “I do not want to be seen as old.” Seniors fear that if they use these preventive services, others will see them as “old.” Even now, being old carries a social stigma, particularly associated with real or imagined onset of dementia. In a joint study with researchers at Hallym University in South Korea, we investigated dementia-related stigma in Japan and South Korea. We found that age- and dementia-related social stigmas did interfere with prevention, early detection and early intervention—key components of dementia care. Fear of stigmatization is not limited to dementia, but is generally seen in regard to mental illness worldwide—also interfering with prevention, detection and intervention for mood disorders and other conditions. It appears that creating or “rebranding” such services in a way that avoids or overturns existing prejudices, thus facilitating participation. For example,

3) Hagino, Hiroo et al., *Academic Research Report on Disincentives for Day Long-Term Care Preventive Services*, Japanese Association of Business Management for Long-Term Care, 2011 (Japanese language).

Clinical Art in Japan and Encounter Art in Finland do offer new evidence based possibilities for prevention of dementia and prevention. The participation to the art groups is normal activity and does cause no stigma.

**Reason 2:** “I was not satisfied with the content of the program.” Elderly individuals highly motivated in regard to prevention tend to demand high quality programs suited to their own interests and desires. Standard, prescribed services often do not meet their expectations. For such individuals, flexible, innovative programs are needed.

So “new” functional improvement programs which can reduce such disincentives to participation are needed. While some of these ideas and practices presented in this volume are not new in the sense that they may have been employed in other fields, their application in preventive services is “new.”

## “New” functional improvement programs introduced in this publication

The Introduction to this publication summarizes risk factors for dementia and mood disorders. Scientific, evidence-based preventive services aimed at reducing these risk factors and improving function for daily life have been developed and are available. But participation has remained low due to disincentives such as those presented above. This publication presents a number of “new” functional improvement programs being pioneered in Finland and Japan. We hope these and other developing concepts will provide the “triggers” needed to break through these difficulties.

Part 1 presents examples of using new media and tools to provide established services for reducing risk factors for dementia and depression. Unfortunately, even in modern society, various social stigmas stand in the way of prevention, early detection and intervention in cases of dementia and depression. In such a situation preventive services offered using new tools—which have not been stigmatized—may lower societal/emotional barriers to participation. Enhancements to preventive services will aid in further reducing risk factors. And for highly motivated, knowledgeable individuals, dissatisfied with existing preventive services, novel approaches using robotics or ICT may provide incentive to engage.

Part 2 introduces new functional improvement programs not seen in existing preventive services: programs involving art & culture, sleep control, oral care, maternity/child care support, and karaoke. At first glance, these activities may appear to have little to do with prevention, but considered in detail, they do address risk factors for MCI and depression, as discussed above. As these activities are stigma-free, emotional barriers should be reduced, and engagement enhanced.

Part 3 introduces new examples with widely expanded definitions of prevention. Concepts like ethnicity, culture & spirituality, and Living Lab (community living labs) also appear, at first, to have little relation with prevention or improvement of

function. However, they all have to do with health, which has many facets (i.e., the WHO identifies physical, mental, social and spiritual/cultural dimensions of health). While we may offer sound preventive services, they will have little epidemiological effect if left unutilized by the target population. We thus must take a holistic view, remembering that there are various views of and approaches to health, all of which may be of use in preventive care.

## Towards a dementia- and depression-friendly society

In Japan and Finland, mental health problems related to aging and other causes have quickly become serious national issues demanding an effective response, especially in terms of prevention. In this publication, we introduce examples of new preventive approaches and tools not traditionally associated with dementia and depression, like art and ICT. We find that risk factors for dementia and depression vary with life style, and to address these factors, we need not only existing preventive services but also new services. At the end of the publication, we highlight two themes arising from these examples regarding the potential of new, preventive, functional improvement programs.

The first is the variety, relevance and delivery of preventive services. To effectively reduce risk factors for dementia, depression and other conditions, services should address various aspects of life, increasing the chance that a client will find a way to constructively engage in preventive activities. As mentioned above, preventive services attended by few can only have a small epidemiological effect. Weak or sporadic engagement (e.g., once a month) will also result in little impact. This hurdle is made higher by the fact that individuals usually seek medical treatment after noticing a problem. In the case of prevention, however, there is no apparent problem, and thus no obvious need for help. For effective prevention, preventive services need to attract voluntary, regular, sustainable engagement.

In order for preventive activities to become embedded in daily life, integration with various interests and pleasures is vital. A number of the new preventive services introduced in this publication are new in the sense that comprehensive services—and the interest, enjoyment, connection, etc. which they provide—can become embedded as valued parts of daily life. Japanese preventive services tend to emphasize scientific evidence, training and evidence of effectiveness. In contrast, Finnish preventive services put more weight on comprehensiveness, sustainability and feasibility. We expect that readers from other countries will find this contrast useful as they ponder what approaches would be most effective in their own countries and cultures.

There are various models or patterns for providing social services. Compared with the other Nordic welfare states, where the first (government) sector plays the main role in welfare service provision, the Finnish system is relatively pluralistic, involving multiple sectors—first (government), second (for-profit corporations) and third (NPOs, NGOs, individuals). New Finnish preventive services introduced in

this publication are partly provided by professionals from the first sector, while other preventive services are provided through multi-sector (1-3) collaboration on the Living Lab<sup>4</sup> stage. From a “wise use of limited resources” perspective, these new service provision systems are very important. The Japanese Total Project for Care Prevention /Daily-Living Support is one of these. It involves not only social welfare and health care professionals from the first and second sectors, but various actors—including NPO/NGOs, volunteers, students, families and the elderly—in developing and providing sustainable and effective prevention services.

The second theme is the importance of community and society. Although social stigmas can retard progress in preventive care, especially on the local, community level, local societies can also be a powerful force toward the involvement of community members in providing and accessing preventive services.

One’s familiar, local community has special powers. And local communities will soon play increasingly important roles—as a source of regional social resources and as an arena for encounter and collaboration between stake holders. Japan’s newest Community-Based Integrated Care Systems are also based on this concept. Collaboration of community members in providing these new preventive services should reduce social stigmas on dementia and depression.

As humans, we cannot escape the four sufferings of birth, aging, disease, and death. Perfect prevention is impossible. We all lose function with age, suffer with disease and finally die. However, even if death and functional loss are inevitable, it is possible—through a variety of preventive activities—to postpone or lessen that loss, thus providing precious time and preservation of human dignity. New preventive services introduced here have the potential to create arenas in which individuals from various backgrounds and in various circumstances (age, life stage, occupation, knowledge, health situation, occupation, etc.) encounter one another. The co-creative and emergent collaborative processes involved in these services will bring these individuals into close contact with dementia and depression. They will “face these problems comprehensively, as if they were their own affairs,”<sup>5</sup> and be true social stakeholders. Such a society will be a dementia- and depression-friendly society, in which we retain membership in familiar society, even in the midst of dementia or depression.

We finish this publication hoping for such a dementia- and depression-friendly society realized through collaboration on “new” preventive, functional improvement programs such as those introduced here.

4) “Living lab” is a user-centered, open-innovation ecosystem, often operating in a territorial context, integrating concurrent research and innovation processes within a public-private-people partnership. For Laurea’s Living Labs, please see their HP. <https://www.laurea.fi/en/research/laurea-living-labs/>

5) “Wagakoto Marugoto” is a new slogan from the Japanese MHLW referring to the establishment of a symbiotic regional community based on partnership between public, private and individual stakeholders. In such a community, the distinction between service suppliers and clients will be vague, and all (first, second and third sector) actors will engage in establishing and managing their own communities by suppling comprehensive services based on the various needs at hand.



## ACKNOWLEDGEMENTS

**Tetsuo Otani**  
President  
Tohoku Fukushi University

**I**t is our great pleasure to publish this book as TFU-LAUREA UAS 4th joint publication. We really appreciate the twenty-nine researchers from both TFU and LAUREA UAS who kindly contributed the academic articles in this book, and also Professor Ken Schmidt of TFU, who undertook the difficult task of checking the language.

In general, academic joint research among universities must rely on outside subsidies, and between that and the constant rotation of staff, these projects tend to be very fragile. But TFU-LAUREA UAS interactions have been successful for more than thirteen years in spite of several changes in its members. During our cooperation, the Great East Japan Earthquake and Tsunami struck seven years ago, leaving great scars in Japan, but I believe that the reason we could transcend these difficulties and still successfully succeed in our joint research is our common spirituality and philosophy.

TFU was established as an education and training institution of the Soto sect of Japanese traditional Buddhism. Our school motto is *Gyo-Gaku-Ichinyo*, which means “the integration of learning and practice”. And the TFU educational philosophy is *Jiri-Rita-Enman*, which means “mutual support makes us both happy”. As religious training and religious enlightenment is inseparable, learning in university should be integrated with practice, and it should be returned to the society. TFU educates students and contributes to the society based on this motto and philosophy. I believe this is very much in common with LAUREA UAS’s philosophy of “Learning by Development”.

Nobody can stop time and the years keep going by. In university structures, students and staff change from year to year, we meet and say good-bye to others every year. Yet the staff and students at TFU and LAUREA UAS seek to share these common ideals as beacons. I believe that this fact has made our exchanges successful for such a long time.

I will address these acknowledgements with our hope that our good relations will continue even longer and that we will be able to provide many more fruits to society in the future.

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TO THE MEMORY OF DR. KOICHI OGASAWARA, TFU PROFESSOR AND LAUREA INTERNATIONAL ADVISORY BOARD MEMBER. WE THANK HIM WARMLY FOR INTENSIVE CO-OPERATION AND ALSO ABOUT THE IDEA OF THIS PUBLICATION.



**LAUREA**

UNIVERSITY OF APPLIED SCIENCES

*Together we are stronger*



Hiroo Hagino, Hannele Niiniö &  
Päivi Putkonen (eds.)

## NEW WAYS OF PROMOTING MENTAL WELL-BEING AND COGNITIVE FUNCTIONS

In Japan and Finland, mental health and memory problems related to aging and other causes have quickly become serious national issues demanding an effective response, especially in terms of prevention. In this publication, we introduce examples of new preventive approaches and tools not traditionally associated with dementia and depression, like art, culture and technology. We find that risk factors for dementia and depression vary with life style, and to address these factors, we need not only existing preventive services but also new ones.

At the end of this publication, we highlight two themes arising from these examples regarding the potential of new, preventive, functional improvement programs. The first is the variety, relevance and delivery of preventive services. To effectively reduce risk factors for dementia, depression and other conditions, services should address various aspects of life, increasing the chance that a client will find a way to constructively engage in preventive activities. Preventive services challenge is that only a few attend to them and thus they can only have a small epidemiological effect. For effective prevention, preventive services need to attract voluntary, regular and sustainable engagement.